

*Yukon northern electric
power policy file*

E.R. West

(6)

April 17 1969

The Chairman
Standing Committee on Indian Affairs
and Northern Development
House of Commons
Ottawa, Canada

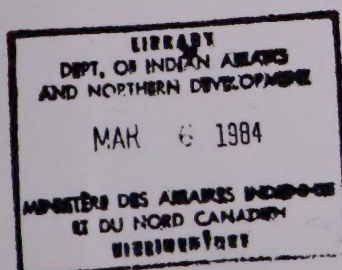
Dear Sir,

THE ROLE OF INVESTOR-OWNED ELECTRIC UTILITIES
IN THE DEVELOPMENT OF THE NORTH

Enclosed herewith thirty-five copies of brief to be submitted on
behalf of The Yukon Electrical Company Limited.

Yours respectfully,

R. H. Choo
R. H. Choo
General Manager



A Brief Presented By
The Yukon Electrical Company Limited
to
The Standing Committee on Indian Affairs and Northern Development

April 1969

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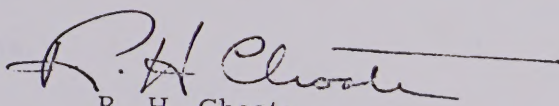
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Yours respectfully,


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General Manager

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THE YUKON ELECTRICAL COMPANY LIMITED

The Yukon Electrical Company Limited would like to express its appreciation to the Chairman and Members of the Standing Committee on Indian Affairs and Northern Development for the opportunity to present the Company's views on power development in Northern Canada and its associated problems.

April 1969

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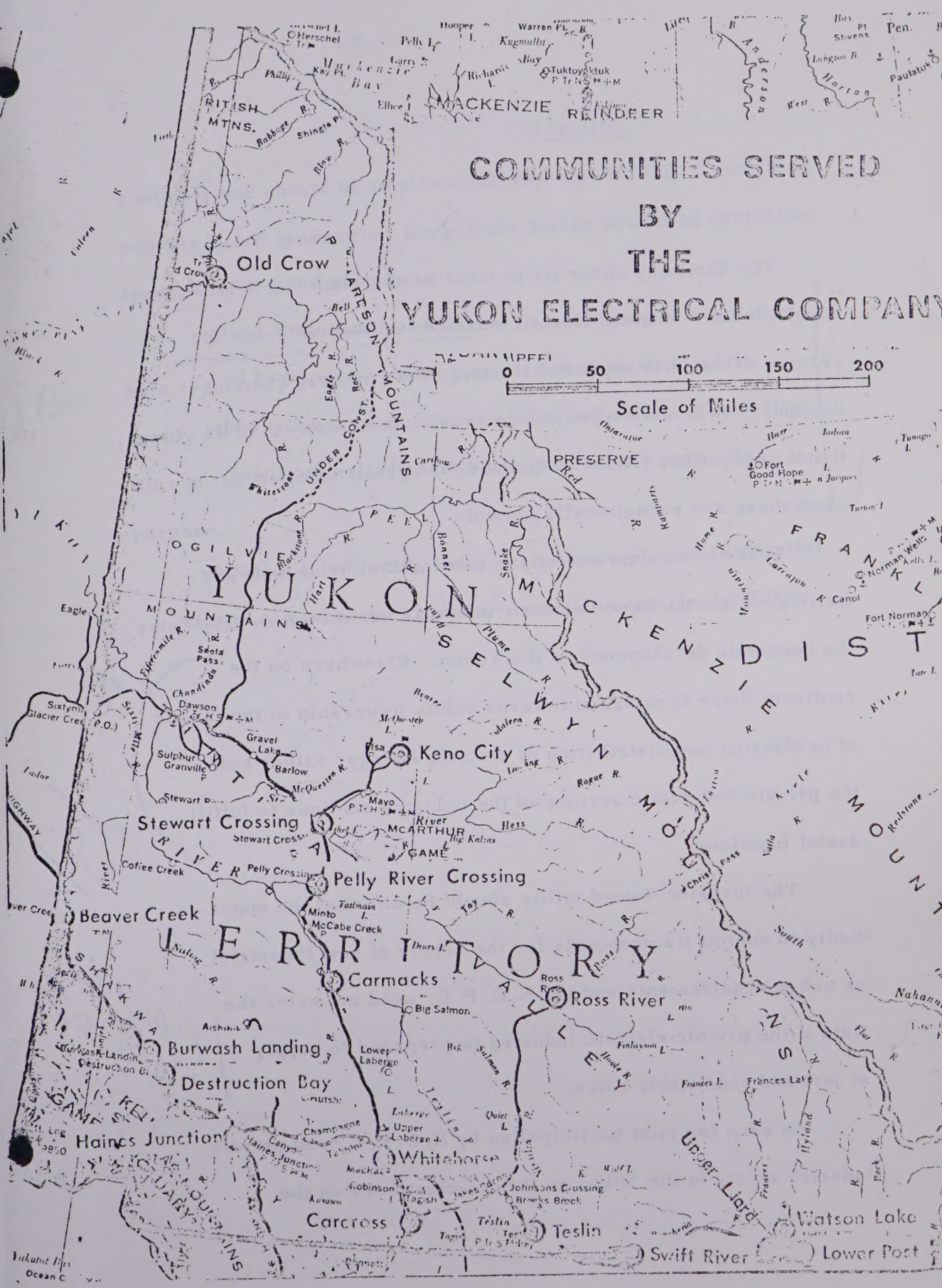
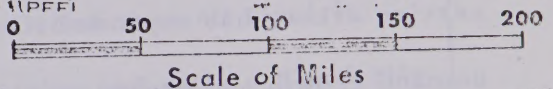
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COMMUNITIES SERVED
BY
THE
YUKON ELECTRICAL COMPANY



SUMMARY

The Company under its present ownership has provided adequate and economic electric service to consumers in its service areas, has expanded its operations as required by demand growth and expresses its readiness to develop additional generation, transmission and distribution facilities when these are economically feasible.

There is no warrant for the assumption that a monopolistic government-owned electric utility is necessary to ensure the economic development of the Yukon. Elsewhere on the continent there is no trend towards public ownership of the means of production and distribution of electric energy, rather both the private and public sectors of the industry continue to fulfill useful functions.

The investor-owned utility should be afforded the opportunity to submit its proposals for the supply of new industrial or urban requirements and the N. C. P. C. need not enter the field if the private electric industry is prepared to supply at just and reasonable rates.

An area for joint participation by N. C. P. C. and private industry exists in the Yukon as it does elsewhere on the

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continent and should be implemented namely, N.C.P.C. might provide hydro generation, the private sector providing operation, transmission and distribution.

P.O.C.
The Company has no objection to submitting to regulation by a regulatory authority with jurisdiction over all electric supply as to service areas, construction and rates. The facilities of the National Energy Board might usefully serve this purpose.

The Company, in this brief, proposes a plan of residential rate equalization for the Company's service areas in the Yukon.

Identity and Financial Responsibility

The Yukon Electrical Company Limited is a company incorporated in 1901 under an ordinance of the first Territorial Council. The Company is a wholly owned subsidiary of Canadian Utilities, Limited of Edmonton, which is a Canadian-incorporated public company whose shares are listed on the Toronto Stock Exchange.

Canadian Utilities, Limited, along with its related companies, Northland Utilities Limited, Northwestern Utilities, Limited and Canadian Western Natural Gas Company Limited have for many years provided electric and gas service to many parts of Alberta and, in addition to the Yukon, to a few communities in British Columbia, Saskatchewan and the Northwest Territories. All are subsidiaries of International Utilities Corporation, a multi-national company resident in Canada with its head office in Toronto.

The foregoing utility companies serve in total approximately 335,000 gas and electric customers, including domestic gas supply in Calgary and Edmonton, and have a net utility plant with a book value of the order of \$250,000,000.00.

The parent company, International, has assets in excess of one billion dollars.

The electric companies supply 70,000 customers of which Yukon Electrical serves 3,400. Generating capacity in Alberta totals 185,000 KW, in the Yukon 8,500 KW, and in N.W.T. 3,300 KW,

300,000 KW additional capacity is under construction or committed.

History

Following its incorporation, The Yukon Electrical Company commenced the supply of electric service in Whitehorse utilizing a 30 KW 220 Volt DC steam driven generator. The system gradually grew until the start of World War II at which time a dramatic expansion took place. The construction of the Alaska highway following Pearl Harbour brought a substantial influx of both Canadian and American military and civilian forces to Whitehorse. The Yukon Electrical Company was hard-pressed to meet its loads, and several military-owned plants were built, each with a related distribution system.

By the early 1950's, supply in the Whitehorse area was still in a crazy-quilt pattern with five or six Army, Air Force and civilian-operated plants in existence, having duplicate distribution facilities, in some cases hazardous to workmen and the public. The Yukon Electrical Company at that time possessed one diesel plant, and two small hydro plants.

Although the Company's tenure had already been lengthy, it was not until 1954 that franchise contracts were entered into by both the City of Whitehorse, and the Commissioner of the Yukon, to formalize the Company's operations in the Whitehorse area. The latter agreement followed passage of enabling legislation by the Territorial Council. As a result, at the present time the Company is enfranchised to serve Whitehorse and the surrounding twelve mile radius.

From time to time, Canadian Utilities, Limited had received informal suggestions from various government and military sources that it should interest itself in northern expansion. In 1957 it commenced negotiating for the Yukon Electrical system, and in early 1958 acquired ownership. Prior to the purchase verbal enquiries at the Federal and Territorial levels, as well as in the Whitehorse business community elicited encouragement.

The previous owners had been hard pressed for money to meet necessary plant expansion, and efforts to attract capital, including prolonged negotiations with the Industrial Development Bank, had been unavailing. At the time of its acquisition by Canadian Utilities, the distribution system and diesel plant were in admittedly poor repair, service was unreliable, rates were high, and many conditions of public hazard existed.

The new owners promptly undertook the re-construction necessary to bring safety and service levels to accepted Canadian Electrical Code standards. Rates were re-designed and lowered to encourage increased use. As a matter of interest, the lowest step in the Whitehorse residential rate in 1957 was 5¢ per KWH, which today is the highest step, the lowest being 1.6¢.

At the same time, an expansion program designed to bring central station service to the smaller communities was undertaken. With the encouragement of the Commander of the Northwest Highway System (Alaska Highway), in 1958 a diesel plant was installed in

*Buildings 1958 - Haines 1 Diesel
- 7 - Whitehorse
60 - 4 - Carcross
60 - 1 - Carmacks*

Haines Junction, 100 miles west of Whitehorse, and service was provided to the Department of National Defense's Highway Maintenance Establishment and the Department of Agriculture's Experimental Station.

In 1959, the Company acquired a small existing diesel plant providing limited service in Watson Lake, 300 miles east of Whitehorse, (where the owners were charging 25¢ per KWH), and service was extended to the entire community and to the Department of National Defence's Maintenance Establishment there. A new power plant was built, and the original distribution system was rebuilt to modern engineering standards. The following year, and after thorough cost studies by the Federal Government, a 7 mile line was constructed to supply the Department of Transport airport facility at Watson Lake enabling that Department to shut down their own supply station. The lowest rate at Watson Lake is now 3 1/2¢ and has been since 1965.

The Territorial Government and individual councillors urged the Company to install facilities in Carcross, 48 miles south, and Carmacks, 100 miles north of Whitehorse, and in 1960, diesel plants were constructed and service was provided in these communities.

In each instance, franchise agreements were entered with the Commissioner of the Yukon.

In 1962, the Company was able to negotiate the purchase of that part of the Department of Transport's system which served a portion of the community of Teslin relieving the Department of responsibility as a power supply agency, and also an agreement was

reached whereby the Department would purchase its power requirements from the Company. In the result, a new power plant was installed and the entire system in that community was extended and upgraded.

The same year, the Company received a petition signed by 14 residents of the community of Upper Liard, 8 miles from Watson Lake, and a cooperative agreement was reached whereby the residents supplied local poles and the Company constructed and operated a line to supply the community.

In 1963, the communities of Destruction Bay and Beaver Creek were served after negotiations had been completed with D. N. D. to supply their facilities in these communities. These settlements are 165 and 285 miles, respectively, from Whitehorse.

In 1964, the Territorial Government asked the Company to supply service to the community of Old Crow, located 60 miles north of the Arctic Circle. This was a responsibility unwillingly inherited by the Territorial Government from the Department of Northern Affairs and National Resources. Territorial Government costs to supply were calculated to be 27¢/KWH and the Company agreed on a trial basis to serve the community at 25¢ per KWH. Residential rates since have been reduced to 15¢/KWH.

In 1965, the Company acquired the Keno City distribution system from its previous owners (Bennett Brothers) and introduced rate reductions. The same year, service was extended to Lower Post, B.C. from Watson Lake, a distance of 15 miles, largely at the urging

of Father Levesque, Principal of the Lower Post Indian Residential School. Before service was brought to the community, a Certificate of Necessity and Convenience was obtained from the British Columbia Public Utility Commission with whom the rates were filed, and also an assurance of tenure was obtained from the British Columbia Hydro and Power Authority (who were not, themselves, enthused at the prospect of serving this remote settlement).

In 1965, consequent upon the announcement that the Yukon Consolidated Gold Corporation was closing down its operations, including its ancient hydro plant on the Klondike River, the question of continued supply to Dawson City came up for consideration. The Company advanced a proposal for the construction of a diesel plant, the re-construction of the antiquated distribution system, and operation of the water system for the Territorial Government. The proposal was rejected and the Northern Canada Power Commission was assigned the responsibility of providing this service. The electric rates proposed by the Company were lower than those now charged by the Commission, and including the water system operation, the Company believes the over-all cost of utilities under the proposal would have been lower than is now the case.

Again, at the request of the Territorial Government, the Company undertook the supply to a number of other small settlements. Service was extended to Stewart Crossing in 1965, and Ross River and Pelly

River Crossing in 1966. Also in 1966, a transmission line was constructed from Destruction Bay to Burwash Landing, a distance of 10 miles, to supply the Department of Transport.

Negotiations were completed in 1967 for the supply of service to the community of Swift River.

In 1965, a light rural-type transmission line was built from Whitehorse to Carcross, 48 miles, making hydro power available and enabling the Company to de-commission the local diesel plant and reduce rates. When the Arctic Mine, 8 miles south of Carcross, reached the production stage in 1967 service was extended to it and the whole line strengthened from Whitehorse. This became the first significant construction of a grid system in the Yukon.

As recently as September of 1968, the Federal Department of Public Works, through the Crown Assets Corporation, sold to the Company its remaining distribution lines in the Whitehorse area valued at approximately one-quarter million dollars and these lines are now being operated to supply various Departments of the Federal Government as well as Company customers in those areas.

During the Company's tenure in the Yukon, it has been encouraged by public statements by the Ministers of Northern Affairs, under both Liberal and Progressive Conservative administrations that the policy of the Federal Government was to provide an environment conducive to the investment of private capital in Northern Canada. Additionally, from the foregoing historical summary, it is apparent the Company

has shown no aversion to pioneering and it has been encouraged and well received by local authorities in its efforts to provide service in many remote and tiny settlements to standards available elsewhere in Canada

Service Record

From the foregoing, it will be noted the Company's service area now extends 600 miles along the Alaska Highway, from Watson Lake to Beaver Creek, and 550 miles north to south from Old Crow to the B.C. boundary. A total of 17 communities, ranging in size from 4 customers in Swift River to 2,600 in Whitehorse are supplied with modern, well-maintained, facilities.

There have been complaints at the cost of service in the smaller settlements, and this will be discussed elsewhere in this submission but the Company's service record has not attracted criticism, and in fact its reliability has come to be accepted as a matter of course. Canadian National Telecommunications, for example, who operate the communications systems in the Territory, and the Department of Transport, utilize the Company's service where it is available.

This has not been accomplished by accident. The experience gained in the first remote plants constructed enabled the Company to adapt engineering design to meet the conditions of rigorous temperature, semi-attended operation, and reliability, with all possible economy.

Native staff has been utilized wherever possible and the Company's educational and age requirements have been waived in so doing. On-the-job training has been made available and adequate housing provided where required. It must be admitted, however, that the problem of turnover of native staff remains significant.

The provision of electrical service in this region, on a scale to that available "outside" has been a difficult goal to achieve, and if economy and effectiveness are to be realized, it can only be done in the Company's judgment through autonomy of management with decision-making at the local level.

The Carr Report, at P. 166 in effect acknowledges this when it states:

" The power agency should have its headquarters in the Yukon with a branch office in Ottawa ; it should be competently and adequately staffed with people experienced in the development and distribution of power; and it should be equipped to plan, develop, utilize and operate an effective system of power supply, suitably designed to support the economic development of the Yukon. "

Excluding the reference to Ottawa, this is, in fact, the existing situation. The Managerial, Technical and Supervisory decisions, including planning, are made by qualified resident staff, having available support services from the parent company in Edmonton. The total charges to Yukon Electrical in 1967-68 for these "outside"

services, including computerized customer billing in Edmonton, were under \$20,000. (The Northern Canada Power Commission charged its Yukon operations \$72,604.00 for head office services in the same period).

The Company's success lies in its reservoir of those key employees in its parent, who, mostly young, are pleased at the challenge of the Yukon. After a useful period, these people can then return to the parent, and this pattern, which undoubtedly will remain a fact of Yukon economic life for many years to come, makes available first class technical people who could scarcely be attracted to the North by any other means.

Coupled with the parent company's storehouse of personnel and technical skill, is its ability to finance the construction necessary to meet system expansion and the growing electrical load. The flexibility available in obtaining funds on relatively short notice has made it possible for the Company to keep well ahead of the demands for electricity in the Yukon. It is prepared to undertake larger installations in the future, subject only to the application of accepted economic yardsticks.

The foregoing combination has resulted in the consumer, who after all is the person under discussion, to be well served. Bearing witness to this was an editorial in the WHITEHORSE STAR entitled "Best Thing to Hit Yukon Since Over Proof Rum":

"Yukon Electrical is looking like one of the best things that have

happened to this territory since over-proof rum. The firm has brought reliable and efficient service wherever it's strung wires and has shown a consistent policy of cutting rates wherever costs and consumption warrant such a happy move. Last week Watson Lake residents got the good news that residential consumers would be finding their bills about 16 percent less, with a similar drop on commercial accounts. It's the third decrease in Watson Lake and it results from the increase in use of electrical power. Nice thing to see the company taking this action on its own initiative without pressure from anyone outside the firm....."

More recently, April 10 1969, the reporter to the STAR from Beaver Creek, in referring to the Company's service, wrote: "Taken for Granted. It is, of course, by now, so much an integral part of modern life that we have come to accept, with blasé matter-of-factness, wonders and blessings that would have made the early voyageurs think in terms of miracles, that would have made our footsore and weary forebears of the Gold Rush Days stand stare in utter disbelief. We take it all for granted....."

As already indicated, the investor-owned utility has demonstrated its willingness and ability to provide electric energy to the northern territories; indeed it has taken on the responsibility of serving the least remunerative loads. This was done in the reasonable expectation that the investor-owned utility would have

the opportunity of participating in the development of the area and its resulting markets. The owners of Yukon Electrical are now concerned that an atmosphere of "public ownership only - no others need apply" is developing and a clear statement of government policy that this is not the case is required if private investors are to continue to be interested in providing electric service to the northern territories. The immediate concern develops from two directions, firstly the administrative policy of the Northern Canada Power Commission and secondly from those portions of the Carr Report dealing with the electrical power industry.

The Power Commission was first established in 1948 by the Northwest Territories Power Commission Act for the purpose of administering the Snare River Hydro power development which had been undertaken by the Federal Government in 1946 to supply the power needs of the mining industry in the Yellowknife area. In later years the operations of the Commission were extended to provide hydro electric generation in the Whitehorse area, Inuvik and other areas. Reference to Hansard of 1948 when the original Act was passed and to Hansard of 1956 when the Act was amended indicates clearly that Parliament did not intend to grant a monopoly to the Power Commission. However, when mining development occurred requiring substantial supplies of electrical power, the Crown Commission proceeded to furnish the supply without reference to and indeed

ignoring the indicated interest of private capital. In the case of the Consolidated Mining & Smelting lead-zinc project at Pine Point, N. W. T., Northland Utilities Limited which was already serving the adjacent community of Hay River and which had already investigated the water power potentialities of the Talston River was not given the opportunity to make a proposal and was refused the opportunity to distribute power retail to the resulting mining community of Pine Point. The then Department of Northern Affairs simply decided the Commission would occupy the field without reference to the possibility of private enterprise fulfilling the need. This policy repeated itself at the more recent Anvil Mine project at Faro, Yukon, when Yukon Electrical was frustrated in its attempts to quote on the supply on the ground that the mining corporation was negotiating with the Canadian Government. The Commissioner of the Yukon Territory declined the request of the Company that competitive bids for the supply to the Faro Townsite be invited from the Company and from Northern Canada Power Commission on the ground that differentials existed in electric rates as between communities and that the Northern Canada Power Commission should undertake the distribution "until a conclusive policy on the generation and distribution of power in the territory can be adopted".

The facts are that rates in areas served by the Commission are not equal. Indeed the Power Commission Act has always required that each project of the Commission is to be self-liquidating which must result in the rates equalling the cost of service of each individual project,

① The Company has found that when it approaches the mining industry for permission to submit a proposal for the electric supply that the industry through its negotiations with the Government departments for roads and/or subsidies has already been committed to take its electric supply from the Commission. In effect the Commission enjoys a virtual monopoly, a result which was denied as being the intention of Parliament when the legislation was first introduced.

② The second cause of alarm to private industry arises from the contents of the Carr report to the Government on the Yukon Territory which propounds the opinion that investor-owned electric utilities have no place in the economy of the territory.

It is the submission of this brief that it is a cardinal principle of the free economy that the Government should not occupy a field which private industry is willing and able to supply. It is contended that the Company can supply electric energy at rates competitive with those to be charged by a Crown agency, and particularly so following rebate of Federal Income Tax mentioned elsewhere. Admittedly the agency has access through Government to cheaper money but results indicate that the economies, initiative and skills of private industry more than match the money raising advantage. Comparisons of capital cost per KW and consumer rates as between Northern Canada Power Commission and the Company appear as Tables 7, 8 and 11.

The Role of an Investor-Owned Utility

In addition to its concern with reliable supply, one of the basic characteristics of a business-oriented utility is its competency in the field of marketing and customer service. The Company has aggressively promoted increased use of electricity through promotional rate design, through domestic load building activities, special water heating rates, street light layouts, and assistance to large users in utilizing electricity in off-peak hours. The use per residential customer on the Whitehorse system in 1967 was 16% above the national average. One significant result of these activities has been that the Northern Canada Power Commission has been able to lower its charges to The Yukon Electrical Company (and probably could do so again at this time), with the saving being passed on to the consumers of Whitehorse.

Some details of these marketing activities may be of interest because it is unlikely the N. C. P. C. could or would be able to provide anything approaching a similar service at the same cost.

Off-Peak Water Pumping - City of Whitehorse

A rate was designed to give the City a lower cost of power if they operated their water pumps between 11:00 p.m. and 7:00 a.m., and utilize the storage reservoir during the daytime hours to maintain water service.

Domestic Water Heating

Shortly after the Whitehorse Rapids Plant went into operation, the Company convinced the Commission that a sizeable market for electric water heating could be developed in the community if a

preferential rate was introduced. A rate was designed which made the installation of electric water heaters economical and a large number of customers converted from propane and all new installations are now electric.

Space Heating

Company engineers have done a considerable number of studies for Whitehorse residents and as a result, one motel and 7 residences are now electrically heated.

Infra Red Heating - Whitehorse Civic Center

The Company convinced the City that an electrical infra red heating installation was more satisfactory than a propane one when operating and capital costs were analyzed and safety features reviewed. Engineering of the installation was carried out by Company staff.

Liquid Oxygen Plant

A preferential rate was established in Whitehorse a number of years ago, which made it feasible for a local businessman to install a liquid oxygen plant. This same business man has now enlarged his facilities and has added an acetylene manufacturing plant.

The Company also undertakes a number of other services which are of assistance to the various levels of government and the public.

Design of control systems for warning and signal devices, preparation of wiring specifications and the solution of various technical problems are a few of the projects undertaken. The Company also provided equipment for the Yukon Vocational and Technical Training Centre and from time to time Company staff have acted in an advisory capacity.

Home Economist

The Company has the services of a Home Economist through its parent, Canadian Utilities, Limited, and from time to time cooking schools and other educational programs are staged throughout the system and these are of particular interest to the ladies.

Safety Display

The parent company has a travelling safety display which is designed to make the public (particularly school age children) aware of the hazards of electricity and this display is shown in Yukon communities from time to time.

Electrical Inspection

The lack of an Electrical Protection Ordinance in the Territory has resulted in the installation of a considerable quantity of sub-standard wiring. Company engineers have continually been requested to provide guidance to customers wishing to install adequate wiring, or to those who were attempting to upgrade existing facilities. The pending appointment of an Electrical Inspector and the implementation of the necessary legislation will increase the number of customers requiring assistance, particularly in light of the fact there are no consulting engineers engaged in this field in the Yukon. The Company is in the best position to continue to supply this service to the public.

Rates and Rate Equalization

Apart from making service available at all, the most difficult problem in supplying northern communities is the cost of service. Mention has been made of rates of 15¢/KWH at Old Crow and by Winnipeg or Trail, British Columbia, standards this is indeed high. Nevertheless, with diesel fuel, transported by air on occasion, and costing \$1.38/gallon in the tanks, and with the need for an excess of reserve capacity to ensure continuity of service in event of equipment failure, together with the expense of air transport of maintenance and inspection personnel on a regular schedule, the economics of serving Old Crow are, admittedly, marginal.

While Old Crow is an extreme example, all of the settlements served by the Company suffer to a degree from the same disadvantages of high fuel and maintenance costs, the cost of providing sufficient reserve capacity commensurate with isolated plant operation, and the cost of providing housing and allowances to recompense staff for the isolation of northern living.

Suggestions for government subsidies have been advanced from time to time in both the Yukon and N. W. T., so that some form of rate equalization might be introduced, making it possible for a user in Cambridge Bay or Old Crow, say, to pay the same for an initial basic use as one might pay elsewhere in Canada. A number of studies have been made of this problem with inconclusive results.

Any such proposal encounters the difficulty that the subsidized service would be provided so far below cost, in many instances, that no rational measurement would remain to judge the economics of either the extension of facilities or of incremental (increased) use. For example, if the Whitehorse rates, which are the lowest in the Yukon, were made available on a "postage stamp" basis anywhere in the Territory, there would be no means of determining the distance to which line extensions should be built to serve a new customer. In other words, if construction were to be done at a loss anyway, how big a loss should be accepted in any instance. A one mile extension to an isolated cabin, or five? Presumably the prospective customer, as a Yukon resident, would be entitled to service. In addition, if the same cabin were served at a loss if it used 100 KWH per month, how much greater loss could be tolerated in subsidy if it were electrically heated, at a cost to the occupant of less than the cost of the fuel used in the diesel generators at the source.

It appears, however, to the Company that a reasonable compromise is available, so far as its Yukon operations are concerned, and to a lesser degree to its service in Fort Providence.

Under the Public Utilities Income Tax Transfer Act, 1966, the Federal Government agreed to rebate to the provinces and territories, 95% of the corporate income tax revenues derived from the operations of investor-owned gas, electric and steam utilities within their

Company Proposal

- 20 -

boundaries. The Government of Alberta and both the Yukon and N.W.T. Territorial Councils have agreed to the rebate of this money to the customers of the utilities, and in the case of Alberta the necessary legislation has been passed and regulations are now being finalized covering the mechanics of the transaction.

The Company's proposal is that the existing rate structure would remain, thus retaining an economic yardstick on new service extensions and incremental use, but that the rebate would flow back differentially to effect equalizing of power cost to the residential consumer in its service areas. *(was \$5.00 the Yukon is /city?)*

In the Yukon, by making an "equalization" rebate, there is sufficient money available to arrive, in effect, at a uniform power cost to the residential consumers served by the Company, equal to the present Whitehorse rate.

Similarly, Fort Providence residential would, effectively, have the same power cost as at Hay River.

Additionally, but not part of this proposal, an over-all rebate to all consumers on an across-the-board basis will also be available. This will vary from year to year depending on the Company's tax situation, it is estimated to be about 8% for 1969 for Yukon Electrical and 3% for the N.W.T. consumers of Northland Utilities Limited.

The Company has submitted this suggestion informally to the two Territorial administrations, and presently is preparing a detailed

outline of the mechanics involved.

Rate Regulation

In the Northwest Territories, an Ordinance 1963 Second Session Chapter 23, was passed authorizing the establishment of a Public Utilities Board, but this Board has not yet undertaken to set rates. A similar Ordinance presented to the Yukon Territorial Council died on the order paper at the Fall Session 1968, because it did not provide for regulation of the Northern Canada Power Commission.

As an investor-owned utility, the parent company of Yukon Electrical is accustomed to operate under the regulation of a Utilities Board, and in fact, was instrumental in encouraging the Territorial Administration to secure the services of the Alberta Public Utilities Board in 1961 to review its then rates. These were found at that time to conform to the conditions of the companies' franchises.

Also, the Company has never opposed the establishment of a well-constituted Board to regulate its Yukon and N.W.T. operations, and as noted elsewhere, the B.C. Utilities Commission approved the Lower Post service.

A major problem, however, is the cost to either Territorial government, of assembling the highly skilled staff required for an effective Utilities Board, and the relatively light work load such a Board would have.

As a suggestion, the Company believes consideration might be given to making the skills and services of the National Energy Board available to the Territorial Governments for the regulation of all

electrical rates in the North, including those of the Northern Canada Power Commission.

System Planning

The authors of the Carr Report paint some rather grandiose vistas of enormous power developments in store for the Yukon in the relatively early future, and it is easy on first exposure to be caught up in an excess of optimism for the future of this great land. However, broad generalizations about providing capacity in advance of need and in excess of requirements, at low rates and distributed throughout the Territory so as to attract industrialization, may read well as concepts, but in the Company's submission are no substitute for the more prosaic problem of meeting power requirements as and when they appear.

Short and long range planning decisions respecting power supply in Alberta are being made regularly by Canadian Utilities' engineers in the development of the Alberta grid, and there is no reason the same skills cannot exercise a similar judgment in the Yukon. It is the usual practice of government agencies to retain private consultants to assist it in planning, and in the Company's submission its own engineers are at least as accomplished in this field as any consulting firms in Canada.

Chart #4 gives the Company's estimate of load growth in the Yukon and indicates that the total requirements may approach 196 MW by 1980, compared to today's load of 25 MW. (The C. B. A. Engineering

report, which was used as the basis for some of the Carr Report conclusions, suggested a load of 330 MW).

Chart #5 shows the estimated energy costs for hydro, thermal and diesel generation for various size of plant and clearly indicates that it will be highly unlikely by 1980 to reach the 6 - 10 mill figure referred to by Dr. Carr. (The Chart does not reflect the cost of any transmission lines required to serve future loads). Reference to any nuclear generation is omitted because Mr. J. I. Gray, President of Atomic Energy of Canada, in an address to the Third Northern Resources Conference on April 10 in Whitehorse stated: "Unless there is a significant reduction in the cost of enriched fuel, or a significant new break-through in reactor technology, we hold out little hope for small nuclear power reactors to meet the energy needs for northern Canada."

Large Hydro Developments

Considerable publicity has been given over the years to the large hydro electric potential which exists on the Yukon River and also through schemes to divert the headwaters of the Yukon to tidewater either in British Columbia or Alaska. All of these schemes would develop blocks of power far larger than foreseeable requirements in the Yukon between now and 1980. Interest has been created lately by the formation of an Alaskan State Power Commission and attempts to have a joint U. S. - Canadian study undertaken for the development of

the Taiya project. This suggestion has met opposition already in the U.S. Senate and the fact that International Waters are involved will necessitate long periods of negotiation between the two countries.

Large hydro electric generating facilities will not be developed, either at tidewater or on the Yukon River, until (a) very large industries are prepared to locate nearby to utilize the power or (b) it becomes economic to transmit the energy to the B.C. - U.S.A. grid which in all probability will not occur until the B.C. government develops the Liard River system or (c) the Canadian government is prepared to subsidize the initial years of the project's life until loads can be developed to utilize the generating capacity.

Future Development of Generation Facilities

The recently completed Ingledowe report examines a number of potential hydro sites in the Yukon of varying size and cost. Unfortunately none of these are overly encouraging. The Company has also looked into the development of power from coal at Carmacks and believes the possibility of thermal generation should not be discounted. Before any decisions on the construction of additional generating stations are taken, the Company submits private capital should be allowed an opportunity to participate.

Future mining loads in the order of 5 MW or less will in all probability continue to be supplied from local diesel electric plants because of the high cost per KW of hydro developments of that size

and the associated cost of transmission lines from site to mine. The relatively short life of these mines will also tend to favour diesel because the majority of such installations can be salvaged when the mine ceases operation.

Other small industrial loads, such as sawmills, will also probably continue to be supplied from diesel generation unless they are in an area where small hydro sites can be economically developed. (An example might be the development of the Francis River sites to supply mining, sawmill and other loads in Watson Lake - Francis Lake area).

Yukon Power Grid

The Carr Report proposes that a Yukon grid be constructed to provide power to the majority of the mining loads predicted by the C.B.A. Engineering Report.

A transmission line (which is really just a means of moving energy from point "A" to "B") before it is constructed must meet certain requirements. Explained in the simplest terms it must be more economical than the alternatives of constructing a plant at point "B" or moving the energy in some other form (i.e. coal via truck or train, or oil or gas via pipeline or truck). For example, as the Whitehorse system grows, the Whitehorse-Anvil transmission line will in effect be transmitting diesel oil converted to electrical energy which might have been done more economically by moving oil

to Anvil via the returning ore trucks, and thus the need to construct the transmission line might have been eliminated or delayed.

It can therefore be easily seen that transmission lines should only be built to those loads where it is economically feasible to do so, a "Grid", per se, is not necessarily the cheapest method of moving energy around the country.

Foster Report

The main thrust of the Carr Report, so far as it deals with electrical supply is to advocate government ownership of the means of production and distribution. No economics are presented to justify this proposal, nothing to indicate cheaper power or better service to the consumer, or that the public interest is better served. Reference is made to pragmatic rather than ideological reasons being the justification for government ownership, and the suggestion is that the trend is toward government ownership.

It is both stated and inferred that power development on the scale forecast for the Yukon can only be accomplished by government planning and execution because, presumably, private capital is unwilling or unable to carry out large projects. This overlooks entirely that the largest single power development presently under way in Canada is being build at Churchill Falls by private capital, with the ultimate market to be both government and investor-owned systems. The Yukon Electrical Company, and in the N.W.T., Northland Utilities Limited, have indicated willingness on many occasions to undertake such

projects as the Talston River development and its supply to Pine Point, the 138 KV line from Whitehorse to Anvil Mines, a variety of arrangements for augmenting the Whitehorse Rapids Plant, and others.

Both these companies have clearly demonstrated the financial resources and technical skill necessary to construct and operate facilities of this class and kind.

So far as the trend to government ownership is concerned, the most highly industrialized nation in the free world displays anything but a trend to government ownership of its electric utilities. Since much of what is done in Canada is patterned to advantage on the example of American practice, the Company has had Foster Associates, Economic Consultants of Calgary and Washington, D. C. prepare a study of the trend of ownership in the United States and the regulatory procedures existing there.

This study is included in this brief as Appendix A and clearly dispels any suggestion that government ownership is increasing, or that it is essential to power development or planning in the United States. The fact is the business-managed electrical utilities in that country have traditionally had the main responsibility of planning and financing the enormous growth of the industry, and continue to do so.

APPENDIX

THE OWNERSHIP AND REGULATORY STRUCTURE
OF THE ELECTRIC UTILITY INDUSTRY
IN THE UNITED STATES

A REPORT TO
THE YUKON ELECTRICAL COMPANY LIMITED

Prepared By
FOSTER ECONOMIC CONSULTANTS, LIMITED
and
FOSTER ASSOCIATES, INC.

March 1969

FOSTER ECONOMIC CONSULTANTS LTD.

600 SIXTH AVENUE S.W., TELEPHONE 263-1790
CALGARY, ALBERTA

March 21, 1969

Mr. E. W. King, President
The Yukon Electrical
Company Limited
Whitehorse, Yukon Territory

Dear Mr. King:

In response to your request, we have prepared a brief review of the ownership and regulatory structure of the electric utility industry in the United States, a report of which is attached to this letter.

We concur in the inclusion of our report in the brief to be submitted by The Yukon Electrical Company Limited to The Standing Committee on Indian Affairs and Northern Development.

FOSTER ECONOMIC CONSULTANTS
LIMITED

Radford L. Schantz
Director

Enclosures

RLS/gj

QUALIFICATIONS OF RADFORD L. SCHANTZ

Radford L. Schantz is a Director Foster Economic Consultants, Ltd. of Calgary, Alberta, and a Vice President and Director of Foster Associates, Inc. of Washington, D.C.

He has a Bachelor of Science Degree in Electrical Engineering from Syracuse University and a Master's Degree in Business Administration from New York University.

His background and experience has been in economics since 1949 when he was employed by the Consolidated Edison Company of New York, an electric and gas distribution utility, in their system engineering department.

From 1951 to 1954 he was a lecturer in economics, public utilities and transportation at New York University. In 1954 and 1955 he was a Visiting Associate in Business Research at the Graduate School of Business Administration, Harvard University. The Harvard assignment was to prepare studies on the economic effect of regulation of electric utilities in Central America and South America in behalf of the International Bank for Reconstruction and Finance. These studies were published by the Johns Hopkins Press in 1959 under the title "Electric Power Regulation in Latin America."

Since 1955 he has been affiliated with Foster Associates and has prepared numerous studies for the management of government and industry, and studies for use in court and regulatory proceedings, on matters pertaining to a broad range of economic problems. A number of these studies were concerned with economic aspects of the electric power industry, natural gas pipelines and distributors, the telephone industry, railroads, airlines, and other public utility industries. From a geographic point of view, Mr. Schantz has specialized in Western Canada.

THE OWNERSHIP AND REGULATORY STRUCTURE
OF THE ELECTRIC UTILITY INDUSTRY
IN THE UNITED STATES

The purpose of this study is to review the structure and ownership of the electric utility industry in the United States. While this review is primarily concerned with recent events and trends, a historical perspective is also provided in order to better understand the framework of the industry.

1. Summary

The generation, transmission, and distribution of electricity constitutes one of the largest, most dynamic, industries in the United States. And, the ability of this industry to construct facilities in advance of requirements, and to provide electricity at reasonable and decreasing costs has been a major impetus to the economic growth of the United States.

As of the year 1967, installed electric generating capacity amounted to 286 million kilowatts, of which 93 percent represented capacity installed by the electric utility industry and the remaining 7 percent represented capacity installed by mines, manufacturing plants, and railroads.

The focus of this review is on the electric utility industry which is made up of both investor-owned companies and government agencies. As of 1967 the investor-owned utilities accounted

for 75.8 percent of total installed generating capacity; federal government agencies accounted for another 12.6 percent; municipal utilities, power districts, and state agencies for 10.5 percent; and cooperatives for the remaining 1.1 percent.

The electric utility industry has grown very rapidly in recent years. Over the twelve-year period from 1955 to 1967 installed generating capacity increased by 133 percent and sales of electricity increased by 130 percent. Investor-owned utilities and government agencies have shared equally in this growth, as illustrated by the fact that investor-owned utilities accounted for 75.9 percent of the installed capacity as of 1955, compared with 75.8 percent as of 1967. It is therefore clear that the ownership of the electric utility industry has remained in balance over this twelve-year period, and from no point of view can it be inferred that investor ownership is giving way to government ownership of facilities, or vice versa. As to the future, a gradual increase in the relative ownership by investor-owned utilities can be predicted.

Furthermore, it can be said that a high degree of cooperation has been established between government and investor-owned facilities, to the benefit of the consumer. For example, over 60 percent of the electricity generated by federal government plants in 1966 was sold to cooperatives, investor-owned utilities, power districts, and municipal utilities, for distribution to the ultimate consumer. On the other hand, municipal utilities

and power districts generated only 50 percent of their sales, and cooperatives only 22 percent of their sales. The remainder of their requirements was purchased primarily from federal government plants and investor-owned utilities.

To meet the rapidly growing demand for electricity, investor-owned utilities have invested 57 billion dollars in generation, transmission, and distribution facilities over the period from 1952 to 1967. These funds, consisting of both equity capital and debt capital, were provided by private investors in the full confidence that investor-owned utilities will remain viable within the context of the private enterprise environment in the United States. On the other hand, these investors are fully aware that all investor-owned utilities are regulated by public utility boards, and rates are determined on the basis of the cost to serve the public.

2. Segments of the Electric Utility Industry

The ownership of the electric utility industry can be structured into five segments, or parts -- investor-owned utilities, federal government agencies, municipal utilities, power districts and state projects, and cooperatives. The ownership of installed electric generating capacity in the United States of these five segments was as follows, as of the year 1967:

	Installed Generating Capacity Millions of KW	Percent of Total Industry
Investor-owned Utilities	202.5	75.8
Federal Government Projects	33.6	12.6
Municipal Utilities	17.4	6.5
Power Districts and State Projects	10.8	4.0
Cooperatives	2.8	1.1
Total Electric Utility Industry	267.1	100.0

A brief description of each of these five segments of the industry might be useful:

Investor-owned utilities are companies whose common stock is owned by private investors. Government funds are not required. These companies have formed the nucleus of the electric utility industry in the United States. As of 1967 there were 212 large investor-owned utilities.^{1/} These larger utilities, as well as many other smaller utilities, are geographically scattered throughout the United States.

Federal Government Agencies generate and transmit electricity which is marketed primarily at wholesale, for the most part to cooperatives, investor-owned utilities, and various government-owned distribution utilities. The Tennessee Valley Authority alone accounts for about half of the installed capacity by all federal government agencies. The remainder of the installed capacity is located primarily in the Western part of the United States.

^{1/} Large utilities are defined as those having sales of one million dollars or more.

With a few exceptions, Municipal Utilities are confined to the smaller communities throughout the United States, frequently limited to the distribution of electricity. The number of municipal utilities has been declining primarily because of acquisitions by investor-owned utilities.

Power Districts are important in the States of Washington and Nebraska, although they are also found on a scattered basis in some eight other states. These power districts are, in effect, municipal utilities operating on a county-wide basis. The State of Washington in the 1930's authorized but did not require the establishment of public utility districts. The State of Nebraska in the 1930's expropriated the investor-owned utilities completely and now operate power districts similar to those in the State of Washington.

In addition to Nebraska, four other State Agencies exist, in South Carolina, Oklahoma, Texas, and New York, each primarily concerned with generating electricity which is distributed by other government agencies and investor-owned companies.

There are some 1,100 Cooperatives scattered throughout the United States. These cooperatives have been financed by federal government loans as administered by the Rural Electrification Administration. About 93 percent of these cooperatives are private business corporations. Cooperatives are primarily concerned with the distribution of electricity, purchasing from investor-owned and government generating facilities.

3. Trends in Ownership of the Electric Utility Industry

Trends over the past fifteen years in the ownership of the electric utility industry are set out in graphic form in Exhibits 1, 2, and 3.^{1/}

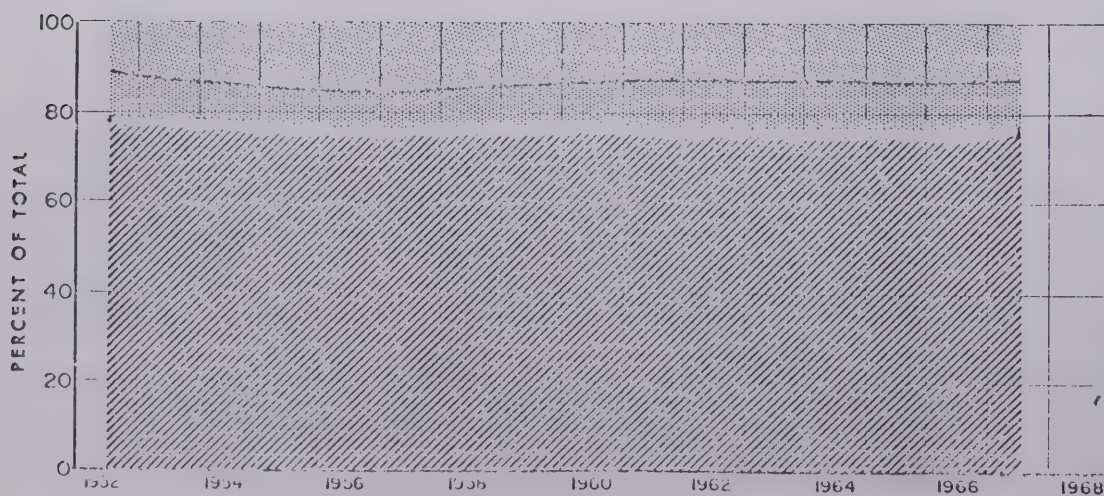
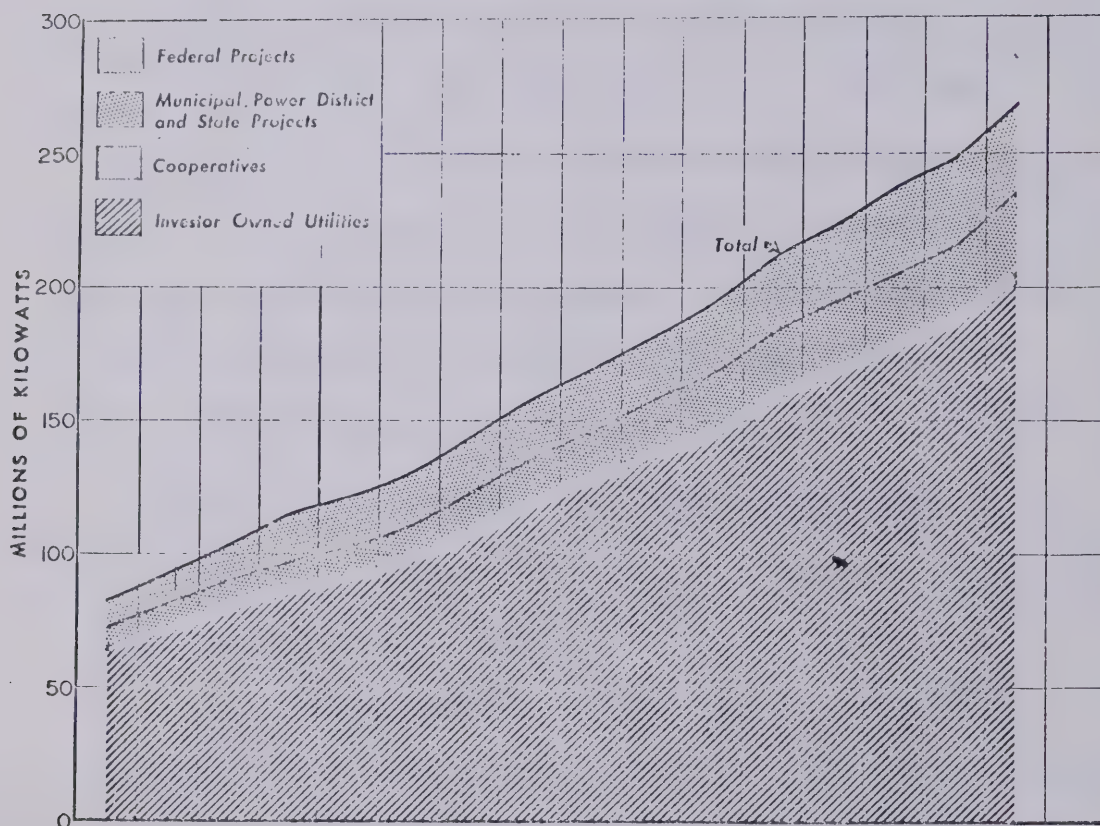
Exhibit 1 shows trends in the ownership of installed generating capacity from 1952 to 1967. Several trends are notable over different parts of this review period. First, by reference to the upper grid, it can be noted that the generating capacity of each segment of the industry has increased substantially in order to anticipate the demands by consumers. Over the fifteen-year period investor-owned utilities increased their installed capacity by 138 million kilowatts; federal government agencies by 24 million kilowatts; municipal utilities, power districts, and state projects by 20 million kilowatts; and cooperatives by 1.3 million kilowatts.

Second, by reference to the lower grid of Exhibit 1, it can be noted that the relative ownership of these generating facilities has changed in degree over the fifteen-year period. Specifically, the investor-owned utility share of generating capacity declined from 78.3 percent of the total in 1952 to 75.9 percent in 1955, but has remained relatively constant since that time, amounting to 75.8 percent in 1967. The relative importance

^{1/} The source of data for these Exhibits are: Statistics of Privately Owned Electric Utilities in the United States, Federal Power Commission, various issues; Statistics of Publicly Owned Electric Utilities in the United States, Federal Power Commission, various issues; Annual Statistical Report, Rural Electrification Administration, various issues; Statistical Year Book of the Electric Utility Industry, Edison Electric Institute, various issues.

INSTALLED ELECTRIC GENERATING CAPACITY IN THE UNITED STATES

BY TYPE OF OWNERSHIP



of federal government installations has followed a different trend, up from 11.8 percent in 1952 to a highwater mark of 15.2 percent in 1956 and 1957, declining thereafter to 12.6 percent by 1967. The relative importance of municipal installations has gradually but continuously declined over the fifteen years, amounting to 6.5 percent in 1967, down from 7.3 percent in 1952. On the other hand, generating capacity installed by power districts and state projects, and cooperatives has increased in relative importance. In 1967 power districts and state projects accounted for 4.0 percent of installed capacity, up from 2.0 percent in 1952. For cooperatives, installed generating capacity accounted for 1.1 percent of the total, up from 0.6 percent in 1952.

As to the future, some gradual increase in the percentage of total installed generating capacity owned by investor-owned utilities can be expected. Planned additions announced for the period 1968 to 1974 by the electric utility industry show 81.5 percent will be installed by investor-owned utilities; 8.6 percent by municipal utilities, state projects and power districts; 8.3 percent by federal government agencies; and 1.6 percent by cooperatives. These projections are considered to be reliable since the electric utility industry typically needs to plan five to seven years in advance of requirements because of the lead time necessary to construct large generating facilities.

Exhibit 2 sets out in graphic form the generation of electricity by the above mentioned installed generating capacity. Once again, the generation of electricity by the electric utility industry is broken down over the fifteen-year period into segments of the industry. These trends, of course, are quite similar to the trends in Exhibit 1. The only notable difference is that investor-owned utilities account for a higher percent of total electricity generated compared with installed capacity. This indicates a greater annual use of generating facilities by investor-owned utilities compared with other segments of the industry, e.g. -- a higher "capacity factor."

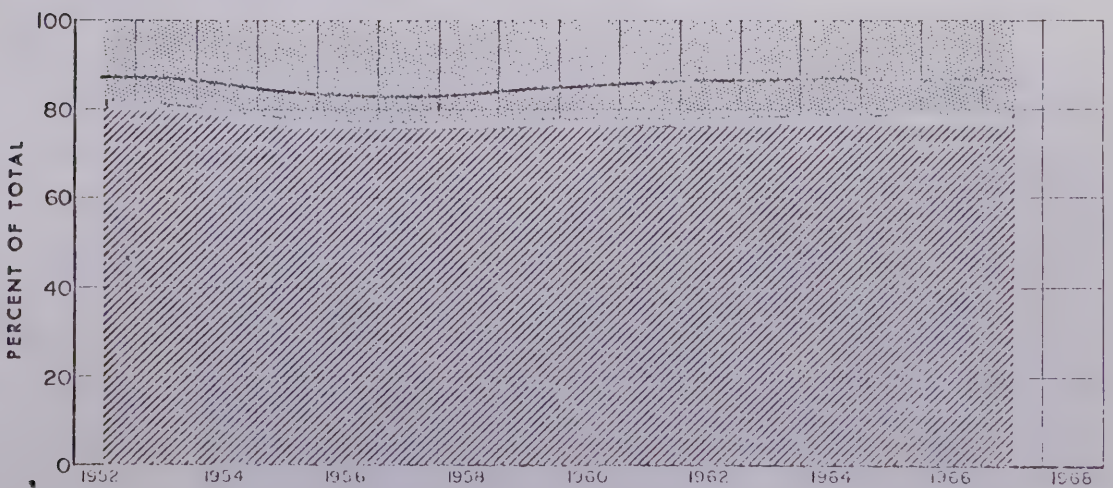
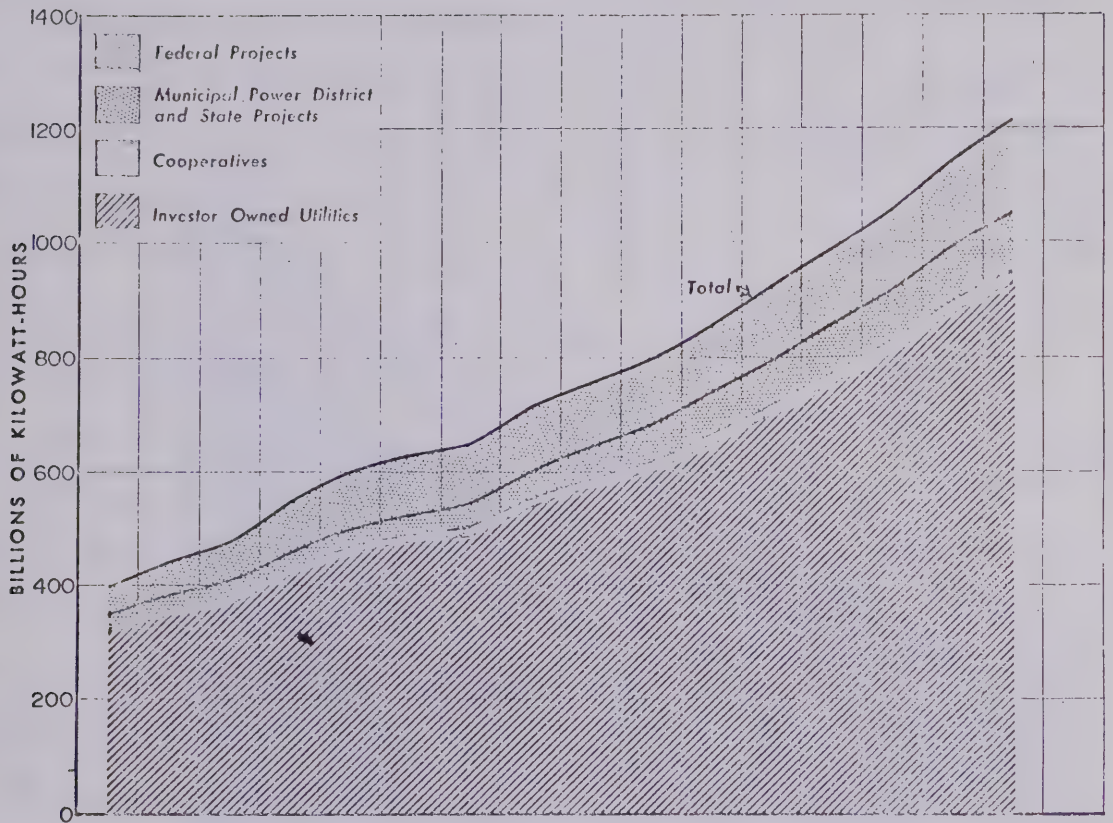
The disposition of electricity generated by the electric utility industry is in two parts -- first, sales to ultimate consumers, and second, sales to other utilities or agencies for resale to ultimate consumers.^{1/} Exhibit 3 sets out kilowatt hour sales to the ultimate consumers by segments of the electric utility industry over the fifteen-year period.^{2/} While the upper grid of Exhibit 3 shows an increasing volume of sales by each industry segment, the lower grid of Exhibit 3 shows a somewhat different pattern than the lower grid of Exhibits 1 and 2.

^{1/} The plant use and "loss" of electricity is a relatively small part of the disposition of generated electricity.

^{2/} Separate data is not yet published for sales of electricity by federal agencies, state projects, municipal utilities, and power districts for the year 1967.

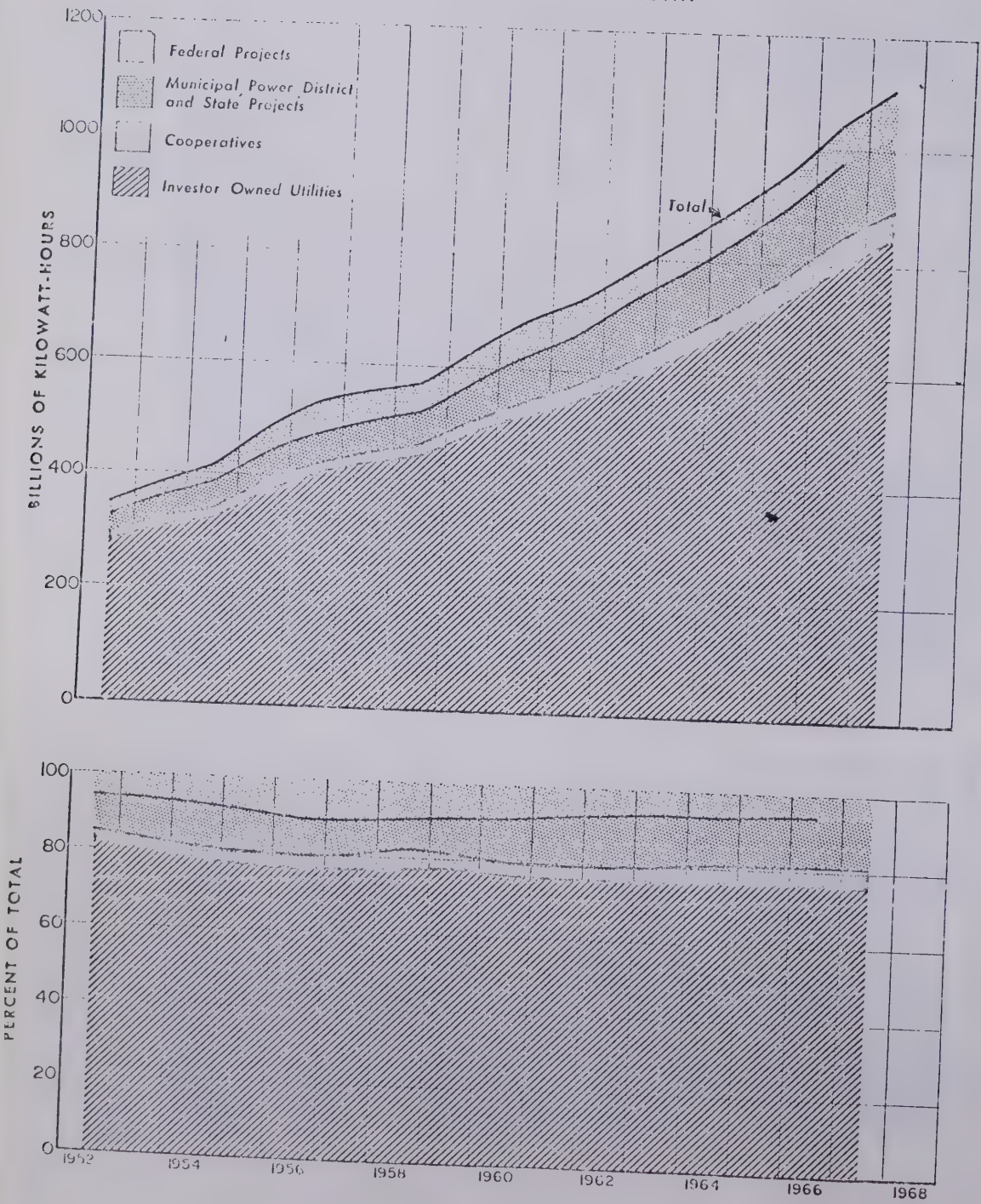
GENERATION OF ELECTRICITY IN THE UNITED STATES

BY TYPE OF OWNERSHIP



SALES OF ELECTRICITY TO ULTIMATE CUSTOMERS IN THE UNITED STATES

BY TYPE OF OWNERSHIP



Most noticeable is the fact that sales by federal government agencies represent fractionally less than half of total electric generation by these installations. Said another way, considerably more than half of the electricity generated by federal government projects is typically sold to other utilities -- investor-owned utilities, municipal utilities, power districts, and cooperatives -- for distribution to the ultimate consumer.

The reverse effect is apparent for municipal utilities and cooperatives -- they purchase, in varying degree, a substantial portion of their customer requirements from investor-owned utilities, federal government agencies, and state government projects.

The investor-owned utilities follow yet a different pattern. Sales to ultimate consumers have increased at about the same rate as generation of electricity, indicating that investor-owned utilities have purchased about the same amount of electricity from government agencies as they have sold to these agencies.

In summary, the data set out in Exhibits 1, 2, and 3 underline two important facts. First, the investor-owned utilities have continuously maintained about 76 to 77 percent ownership of the electric utility industry in the United States since the year 1955. This constant relationship is true whether the industry is measured by installed electric generating capacity, the generation of electricity or the sale of electricity. As to the future, some gradual increase in ownership can be predicted for the investor-owned utilities.

Second, there exists a high degree of inter-system sale and interchange of electricity between the several segments of the electric utility industry. This fact will be explored in more detail in the following section of the study.

4. The Sale and Interchange of Electricity Between Investor-Owned Utilities and Government Projects in the United States

If a map of the United States were multi-colored to portray the location of investor and government-owned generating projects, and distribution service areas, the results would be similar to a "crazy quilt" pattern. This is because these facilities were constructed at different times and for different purposes. Thus, the service areas of investor-owned utilities, federal and state government projects, municipal utilities, power districts, and cooperatives do exist side by side in the myriad of combinations throughout the United States. It is therefore to be expected that a multiple combination of arrangements between these utilities for the sale and purchase of electricity has been arranged over the years. As a result of these arrangements the consumer benefits over the long-term by receiving a reliable and low cost source of electricity.

A statistical summary of the composite results of these arrangements is set out for the year 1966 on Exhibit 4. This can be considered typical of other recent years. In brief,

EXHIBIT 4

SOURCE AND DISPOSITION OF
ELECTRICITY IN THE YEAR 1966

<u>Source</u> ^{1/}	<u>Investor-Owned Utilities</u>	<u>Federal Projects</u>	<u>Municipal Utilities & Power Districts</u>	<u>Cooperatives</u>
Generation	86.1%	89.2%	49.5%	17.3%
Purchase	<u>13.9</u>	<u>10.8</u>	<u>50.5</u>	<u>82.7</u>
Total	100.0	100.0	100.0	100.0

<u>Disposition</u> ^{2/}				
Sales to Ultimate Consumer	84.7%	37.7%	80.4%	67.4%
Sales for Resale	<u>15.3</u>	<u>62.3</u>	<u>19.6</u>	<u>32.6</u>
Total	100.0	100.0	100.0	100.0

1/ Excludes net interchange, net transmission for/by others and electricity used for pumped storage.

2/ Excludes electricity used by utility and losses.

Source: Statistics of Privately Owned Electric Utilities in the United States, 1966, Federal Power Commission, September 1967.
Statistics of Publicly Owned Electric Utilities in the United States, 1966, Federal Power Commission, November 1967.
1967 Annual Statistical Report, REA Bulletin 1-1, U. S. Department of Agriculture, October 1968.

the Exhibit shows all segments of the industry generate and purchase of electricity, and that they all sell to other distribution systems as well as to ultimate customers located in their service area. However, each segment differs, one from the other.

Investor-owned utilities generate 86 percent of their requirements and purchase 14 percent. They sell 85 percent of this electricity to the ultimate consumer, with the remaining 15 percent being sold to other distribution systems. With respect to the sales to ultimate consumers, about one-quarter is sold to residential customers, about two-thirds to commercial and industrial customers, and the remainder is sold for street lighting, railway uses, and the like. Full information is not available with respect to a breakdown of the ultimate disposition of the sales by investor-owned utilities for resale by other distribution systems. However, data is available with respect to "firm" sales for resale (as opposed to "interruptible" sales for resale), and this data shows approximately 66 percent of the sales for resale are made to other investor-owned utilities, 19 percent to municipals and power districts, and 15 percent to cooperatives.^{1/}

Federal government projects are largely confined to the generation and transmission of electricity.^{2/} These projects

^{1/} Sales of Firm Electric Power for Resale, 1965-1966, Federal Power Commission.

^{2/} Except for the Tennessee Valley Authority, all federal projects are based on hydroelectric installations. The Tennessee Valley Authority also generates from steam plants.

do not distribute electricity to residential customers. In 1966 federal projects purchased only 11 percent of their requirements, the remainder being generated. About 62 percent of this electricity was sold to other utilities -- investor-owned utilities, municipals, power districts, and cooperatives -- for resale to residential and other customers. The remaining 38 percent of sales by federal projects were made directly to industrial customers.

Cooperatives purchased 83 percent of their electrical supply in 1966, generating the remainder. Approximately 41 percent of these purchases by coops was from federal projects, 37 percent from investor-owned utilities, 14 percent from other cooperatives, and 8 percent from other government agencies. As to the disposition of electricity purchased and generated by cooperatives, about one-third was sold for resale, primarily to other cooperatives. The remaining two-thirds of sales were to ultimate customers, predominantly residential customers on farms and in smaller communities.

Municipal utilities and power districts in the composite generate approximately half of their electrical requirements, purchasing the other half. The source of the purchased electricity is primarily from investor-owned utilities and federal projects. Approximately 80 percent of the disposition of this electricity is in the form of sales to ultimate consumers, approximately one-third to residential customers and two-thirds to commercial and industrial customers.

5. The Sale and Interchange of Electricity Between Investor-Owned Utilities and Power Districts in the State of Washington

Although included in the above municipal and power district composite data, a unique and quite different pattern has developed in the State of Washington, representing an interesting case history of the arrangements reached between investor-owned and government-owned utilities.^{1/} As of the year 1966, the source and disposition of electricity for these power districts had evolved into a structure where some two-thirds of their electrical requirements were generated, and some two-thirds of their total supply was sold for resale by other distribution systems. While a certain portion of these sales for resale was purchased by other power district utilities, the larger portion was purchased by investor-owned utilities who also operate in the State of Washington. A comparison of the 1966 data with the 1957 data is informative in regard to the trends, and is shown on Exhibit 1. The main thrust of this comparison is the very substantial growth in generating capacity and the generation of electricity by power district utilities.^{2/} As the generation of electricity has grown, so have sales for resale to other utilities. In importance, these resales of electricity have been purchased by

Approximately 78 percent of the generating capacity installed by power districts in the United States is located in the State of Washington.

Almost all of the electricity generated by power districts in the State of Washington has been from hydroelectric plants on the Columbia River.

EXHIBIT 5

Source and Disposition of Electricity By
Investor-Owned Utilities and Power District
Utilities in the State of Washington

1966 Compared with 1967

Generation and Sale of Electricity In Millions of Kilowatt-Hours					Installed Capacity In Thousands of Kilowatts
<u>Generation</u>	<u>Purchases</u>	<u>Sales to Ultimate Consumers</u>	<u>Sales For Resale</u>		
<u>Investor-Owned Utilities</u> ^{1/}					
1966	4,692	6,922	8,179	1,157	1,071
1957	2,785	3,365	4,650	293	615
<u>Power District Utilities</u>					
1966	14,989	7,964	7,698	15,454	2,768
1957	2,148	4,304	4,175	1,980	290

Source: Statistics of Privately Owned Electric Utilities in the United States, 1966, Federal Power Commission, September 1967. Statistics of Publicly Owned Electric Utilities in the United States, 1966, Federal Power Commission, November 1967.

^{1/} Includes Puget Sound Power & Light Co. and Washington Water Power Co. Does not include Pacific Power & Light Co. which operates in Washington and five other Western States.

the investor-owned utilities operating in the state who in turn have distributed the electricity to residential and industrial consumers.

While these recent trends in the State of Washington seem clear, events are beginning to develop which will probably reverse the basic direction of these trends. Investor-owned utilities are commencing to install generating facilities in Washington and government agencies to rely upon these facilities to meet future requirements. As an illustration of these events, two investor-owned utilities, Pacific Power & Light Co. and Washington Water Power Co., are sponsoring construction of a 1.4 million KW steam-electric generating station at Centralia, Washington. These companies will sell to the Federal Bureau of Reclamation and Bonneville Power all of the electricity generated by the first 700,000 KW unit until 1974, at which time Bonneville's share will become available to three other investor-owned utilities. The Bureau of Reclamation will take its portion until 1982, at which time it will revert to the plant owners. The two sponsors are expected to be joined by other investor-owned utilities, power districts, and municipals as partners in the generation of electricity by this plant.

While these arrangements are unique to the State of Washington, they do demonstrate one way in which investor-owned

utilities and government-owned agencies arrive at a common ground of working together in a manner which assures the consumer of a reliable and low cost supply of electricity. A myriad of other arrangements between investor and government-owned utilities has also been established in other parts of the United States.

In summary, it is useful to note that while different arrangements for buying and selling electricity have been established over the years throughout the United States, the end result shows a continuation of the historical importance of electric distribution by investor-owned utilities. As set out on Exhibit 6, in the year 1966 some 73 percent of sales to residential customers and some 81 percent of sales to commercial and industrial customers were made by investor-owned utilities.

6. Operational and Regulatory Characteristics Attending The Electric Utility Industry

The characteristics of electric utilities are very distinct and different from most other businesses. It is therefore helpful at this juncture to touch briefly on some of the more important characteristics and their implications.

Perhaps the most important characteristic of electric utilities is the relatively very large amounts of capital required to provide a local service. Specifically, an electric utility is

EXHIBIT 6

Sales of Electricity to
Residential and Industrial
Customers in the United States

- 1966 -

	<u>Million Kwh</u>	<u>Percent</u>
A. <u>Sales to Residential Customers</u>		
Investor-owned Utilities	184,663	72.5
Federal Projects	6	nil
Municipal Utilities & Power Districts	40,350	15.8
Cooperatives	<u>29,791</u>	<u>11.7</u>
	254,810	100.0
B. <u>Sales to Commercial and Industrial Customers</u>		
Investor-owned Utilities	541,776	80.8
Federal Projects	55,487	8.3
Municipal Utilities & Power Districts	61,061	9.1
Cooperatives	<u>12,356</u>	<u>1.8</u>
	670,680	100.0

Source: Statistics of Privately Owned Electric Utilities in the United States, 1966, Federal Power Commission, September 1967. Statistics of Publicly Owned Electric Utilities in the United States, 1966, Federal Power Commission, November 1967. 1967 Annual Statistical Report, REA Bulletin 1-1, U. S. Department of Agriculture, October 1968. Data for state projects are not published in composite form. These projects, however, primarily sell electricity for resale and not for direct consumption.

required, on the average, to invest about five dollars in capital assets to realize one dollar in revenues (sales). This capital investment is relatively higher than any other major industry, as illustrated by the following ratios:

Investment in Plant & Property
Required to Generate a Dollar of Revenue (Sales)

Electric Utilities	\$ 4.91
Pipelines	4.60
Telephones	4.32
Railroads	4.24
Gas distributors	2.41
Oil and natural gas	2.09
Manufacturing	0.60
Retail trade	0.14

Source: 1966 Taxation Statistics, Part 2, Canadian Department of National Revenue, Taxation Division

Because of this heavy capital investment, electric utilities are a "decreasing cost" industry. This means that the more electricity generated, distributed, and sold by a utility from a given capital investment, the lower the cost to the consumer. And the larger the physical plant constructed, the lower yet the decreasing cost to the consumer.

Because of these characteristics, it was established as early as the year 1848 that public utilities are a "natural monopoly" and, therefore, only one utility should provide a

utility service in a given service area.^{1/} With the rapid growth of the electric utility industry in the United States after the year 1890, the wisdom of this natural law became apparent in many metropolitan areas where more than one utility was serving the area, leading to a duplication of investment in capital assets and thereby leading to "ruinous" competition, to the benefit of no one. Thus, it became apparent that a monopoly should be granted to one electric utility in each service area which, in turn, led to an important public question at the turn of the century in the United States -- How could the public realize the lower-cost benefits of electricity and not be forced to pay the price that these monopolies could command for their indispensable services? The choice lay between public ownership, and public regulation of investor-owned utilities. Legal precedents and the general disposition in the United States towards investor ownership resolved the question in favor of public regulation of investor-owned electric utilities. In fact, regulation was regarded as a substitute for competition. Public policy, through regulation, thus provided an avenue for the achievement of least-cost production of electric utility services and public protection from monopolistic prices. This system was considered all the more effective since the incentives created for investor ownership could still accrue to the benefit of the consumer.

Principles of Political Economy, John Stuart Mills, 1848.

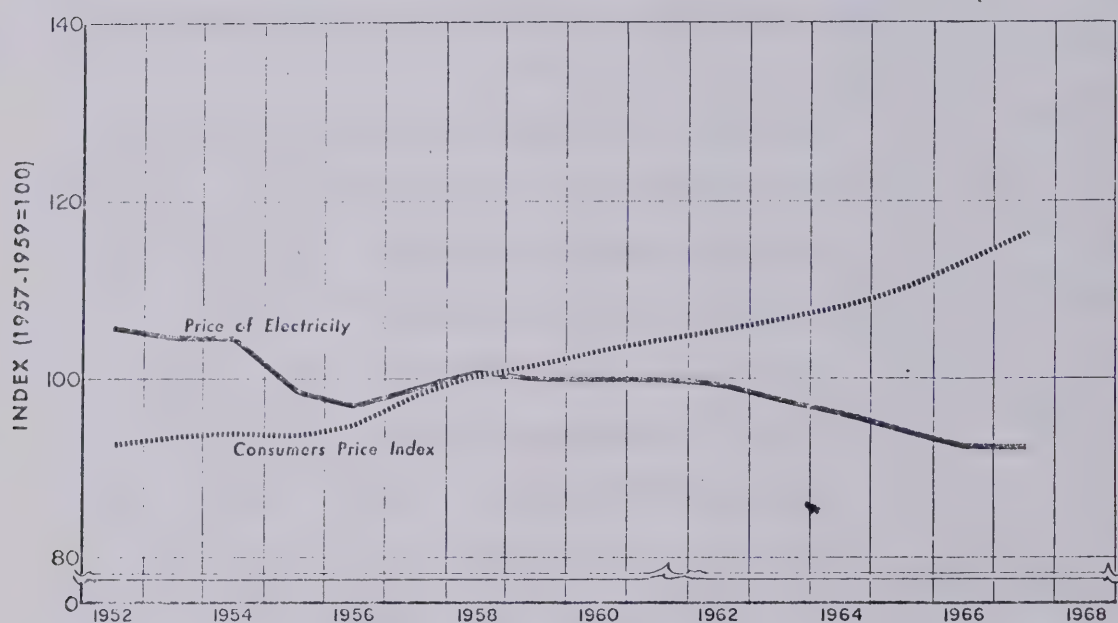
Having established this basic framework, the investor-owned electric utility industry has become an all important factor in creating reliable and low cost energy in advance of requirements, subsuming industrial and economic growth throughout the United States.

As the industry has grown, the regulation of electric utilities has become more sharply defined. Today, the price of electricity charged by all investor-owned utilities is determined by an independent state or federal regulatory board. Typically the price of electricity is set at a level sufficient, but no more than sufficient, to recover legitimate operating costs, an annual depreciation of the capital investment, and a fair return on the capital investment.

The results of this regulated system of private enterprise are well known. As depicted in summary form on Exhibit 7, the price of electricity has continuously declined in the United States, in sharp contrast with the inflationary trend as measured by the consumer price index.

While the story of investor-owned utilities has been one of continuous growth over the past 78 years, government utilities and agencies, and cooperatives, have entered the scene at different times over this period. In fact, many municipal utilities were formed in smaller communities at an early date, in advance of the ability of investor-owned utilities to service these more

AVERAGE PRICE OF ELECTRICITY COMPARED WITH THE CONSUMERS PRICE INDEX IN THE UNITED STATES



	<u>C P I</u>	<u>Electricity</u>
1952	92.5	105.9
1953	93.2	104.7
1954	93.6	104.7
1955	93.3	98.8
1956	94.7	97.0
1957	98.0	98.8
1958	100.7	101.2
1959	101.5	100.0
1960	103.1	100.0
1961	104.2	100.0
1962	105.4	99.4
1963	106.7	97.6
1964	108.1	95.9
1965	109.9	94.1
1966	113.1	92.3
1967	116.3	92.3

Private & Publicly Owned Electric Utilities

marginal markets. By 1923 there were over 3,000 municipal electric operations, but the total now is less than 2,000, primarily as a result of absorption by investor-owned utilities. The same situation, a marginal market not yet served by investor-owned utilities, provided the basis for the federally financed Rural Electrification Administration cooperatives, first organized in 1935, to bring electricity to farms and ranches.

*Investment
in
Public Utilities*

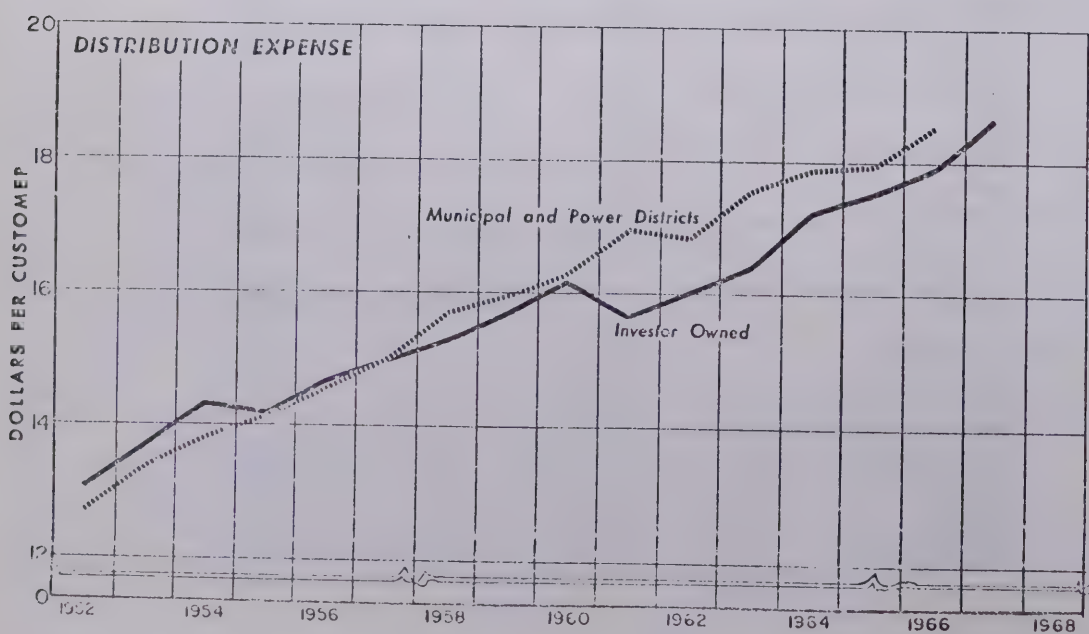
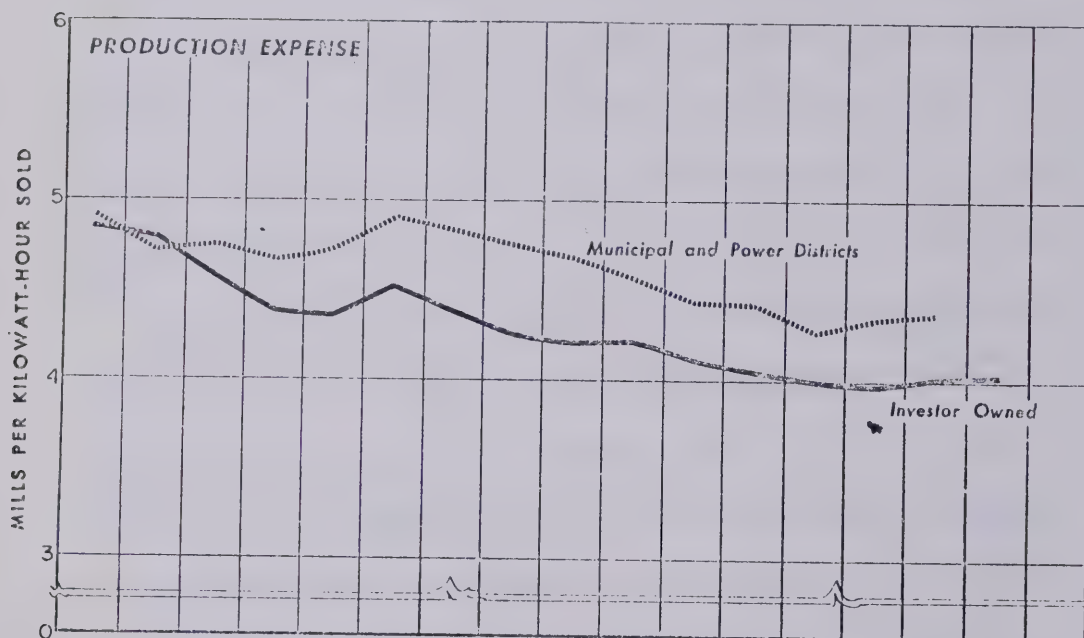
The growth in federal government and power district hydro-electric generation projects was accelerated as a result of the great depression of the 1930's. Deficit government financing of these projects was used in an effort to stimulate the economy.

While government ownership accounts for an important segment of the electric utility industry, the regulatory formula so successfully applied to investor-owned utilities has not been applied to government utilities, except for a relatively small portion of municipal utilities. It may therefore be of some interest to compare the relative efficiencies of investor-owned utilities with government utilities. ^{1/} Two yardsticks of comparison have been set out on Exhibit 8 over the period 1952 to 1968. The first yardstick shows the production expense per kilowatt hour sold and the second yardstick shows distribution expense per customer served.

1/ The source of data for these Exhibits are: Statistics of Privately Owned Electric Utilities in the United States, Federal Power Commission, various issues; Statistics of Publicly Owned Electric Utilities in the United States, Federal Power Commission, various issues.

TRENDS IN PRODUCTION AND DISTRIBUTION EXPENSE FOR ELECTRIC UTILITIES IN THE UNITED STATES

BY TYPE OF OWNERSHIP



As to production expense, the investor-owned utilities have demonstrated a continuing reduction, in both absolute terms and relative to government operations. In absolute terms, production expense of investor-owned utilities has decreased from an average of 4.8 mills per kwh in 1952 and 1953, to an average of 4.0 mills per kwh over the period 1964 to 1967, a 17 percent reduction. For government utilities this expense also declined, from about 4.8 mills in the earlier 1952-53 period to 4.33 mills over the period 1964-66, a 10 percent reduction.^{1/} Relatively speaking, distribution expenses of investor-owned utilities per kwh sold have been about 8 percent below government utilities in recent years, whereas they averaged the same in the years 1952 and 1953.

Distribution expenses, when related to number of customers served, have increased for all utilities in recent years. This expense has increased 33 percent for investor-owned utilities and 39 percent for government-owned utilities, when comparing the average for 1964-67 with the average for 1952-53. Therefore, this expense has increased more rapidly for government utilities than for investor-owned utilities.

^{1/} 1967 data are not yet available for government-owned utilities.

*done and done
done and done
done and done
done and done
done and done*

Thus these two measures of relative performance indicate that investor-owned utilities have performed more efficiently than government-owned utilities over the past fifteen years, and provide a good yardstick for measuring the efficiency of government utility operations. While these yardsticks are helpful, they cannot however be considered as a substitute for cost regulation of government utilities.

There are several other comparisons which may be made between government and investor-owned utilities. First, it can be noted that the rate of return earned on the capital investment in electric utility plant and property, less depreciation reserve, has averaged 7.3 percent since 1963 for investor-owned utilities and 7.1 percent for government-owned utilities. Second, it should be noted that investor-owned utilities pay federal income taxes in the United States while government utilities do not. Thus, there is a clear subsidy of government utilities, provided by the general public to the benefit of only certain regions in the United States. While these regional subsidies may have been justified in the past, for example during the 1930's, these justifications have now disappeared. Fortunately this economic anomaly does not now exist in Canada.

7. The Role of the Electric Utility Industry
in the U. S. Economy

The electric utility industry has been a driving force in the development and growth of the American economy. With managerial foresight, facilities have continuously been installed in anticipation of residential and industrial requirements. As the consumption of electricity has increased, year after year, the industry has been able to install larger facilities, with resulting benefits from economy of scale. This trend, together with improved technology, has lead to a continuous decrease in the cost of electricity which, in turn, has lead to even greater demands for more electricity. Thus, the electric utility industry has enjoyed one of the highest growth rates among sectors of the national economy.

While the regulation of investor-owned electric utilities has been strict, it has also been fair. As a result, investors have looked with favor on these utilities as a reasonable and stable investment, conservatively financed, yet enjoying fair earnings with a strong growth rate. And investors, of course, look with favor on the stability of arrangements reached between investor-owned utilities and government-owned utilities and balanced trends which have taken place since 1955.

Having this confidence is vital to investor-owned utilities who have expended some 57 billion dollars in order to increase production, transmission, and distribution capacities over the

period 1952 to 1967. The annual expenditures are shown on Exhibit 9. These 57 billion dollars represent a very important part of total expenditures by the private sector in the United States. The source of these funds has been private investment in the form of both debt and equity capital. Neither subsidy nor investment from the government has been required. As to the future, it is reasonable to predict this successful application of the private enterprise system will continue to provide the capital and technical requirements necessary to meet the ever-growing demand for electricity in the United States.

EXHIBIT 9

CONSTRUCTION EXPENDITURES BY
INVESTOR-OWNED ELECTRIC UTILITIES

(Millions of Dollars)

<u>Year</u>	<u>Total</u>	<u>Production</u>	<u>Transmission</u>	<u>Distribution</u>	<u>Other</u>
1952	\$2,599	\$1,251	\$ 379	\$ 879	\$ 90
1953	2,876	1,391	442	938	105
1954	2,835	1,280	464	993	98
1955	2,719	1,064	434	1,093	128
1956	2,910	1,029	455	1,274	152
1957	3,679	1,647	594	1,270	168
1958	3,764	1,879	608	1,125	152
1959	3,383	1,519	554	1,163	147
1960	3,344	1,347	539	1,306	152
1961	3,275	1,275	582	1,272	146
1962	3,177	1,089	612	1,313	163
1963	3,338	1,172	648	1,329	189
1964	3,567	1,119	826	1,432	190
1965	4,050	1,309	944	1,594	203
1966	4,962	1,801	1,145	1,778	238
1967	6,140	2,559	1,327	1,986	268

Source: Statistical Year Book of the Electric Utility Industry for 1967, Edison Electric Institute, September 1968.

Table # 1

GROWTH IN RESIDENTIAL CUSTOMERS

<u>Community</u>	<u>Original</u>	<u>Dec./68</u>
Whitehorse	1,230	2,146 (39)*
Watson Lake	31	129 (3)*
Upper Liard	4	19 (17)*
Lower Post	2	5 (4)*
Haines Junction	17	44 (12)*
Carcross	8	48
Carmacks	6	37 (10)*
Teslin	16	42 (11)*
Destruction Bay	0	25 (15)*
Beaver Creek	4	12
Old Crow	2	34 (32)*
Keno City	59	41
Stewart Crossing	0	2
Ross River	1	29 (15)*
Pelly River Crossing	2	29 (18)*

*Native Homes

Table # 2

GROWTH IN GENERAL SERVICE CUSTOMERS

<u>Community</u>	<u>Original</u>	<u>Dec./68</u>
Whitehorse	261	477
Watson Lake	22	71
Upper Liard	1	4
Lower Post	1	3
Haines Junction	17	35
Carcross	8	21
Carmacks	5	20
Teslin	10	26
Destruction Bay	6	14
Beaver Creek	9	13
Old Crow	7	6
Keno City	13	4
Stewart Crossing	2	4
Ross River	2	20
Pelly River Crossing	2	9
Swift River	4	4

Table # 3

GROWTH IN PLANT CAPACITIES

<u>Community</u>	<u>Original</u>	<u>Dec./68</u>	<u>Peak Load Dec./68</u>
Watson Lake	200	1,480	870
Haines Junction	150	550	210
Carcross			
Carmacks	60	450	180
Teslin	250	500	175
Destruction Bay	350	500	185
Beaver Creek	310	310	125
Old Crow	110	130	55
Keno City			
Stewart Crossing	120	100	25
Ross River	15	260	110
Pelly River Crossing	80	100	35
Swift River	200	200	60

WHITEHORSE RESIDENTIAL RATES

<u>1958</u>		<u>1969</u>	
First	10 K.W.H. @ \$2.00	First	40 K.W.H. @ 5¢/K.W.H.
Next	20 K.W.H. @ 15¢/K.W.H.	Next	160 K.W.H. @ 3.5¢/K.W.H.
Next	70 K.W.H. @ 10¢/K.W.H.	Next	100 K.W.H. @ 2.5¢/K.W.H.
Excess	K.W.H. @ 5¢/K.W.H.	Excess	K.W.H. @ 1.6¢/K.W.H.

WHITEHORSE GENERAL SERVICE RATES

<u>1958</u>		<u>1969</u>	
<u>Demand Charge</u>			
First	$\frac{1}{2}$ K.W. @ \$1.00		
Next	$4\frac{1}{2}$ K.W. @ 10¢/100 W.		
Excess	K.W. @ 10¢/200 W.		
First	50 K.W.H. per K.W. @ 12¢/K.W.H.	First	200 K.W.H. @ 6.0¢/K.W.H.
Next	50 K.W.H. per K.W. @ 10¢/K.W.H.	Next	800 K.W.H. @ 4.0¢/K.W.H.
Next	50 K.W.H. per K.W. @ 8¢/K.W.H.	Next	1,000 K.W.H. @ 2.5¢/K.W.H.
Excess	@ 5¢/K.W.H.	Excess	K.W.H. @ 1.6¢/K.W.H.

CARCROSS RATESRESIDENTIAL1960

Demand Charge - \$2.50
 First 35 K.W.H. @ 15¢/K.W.H.
 Next 100 K.W.H. @ 10¢/K.W.H.
 Excess K.W.H. @ 8¢/K.W.H.

1969

First 40 K.W.H. @ 12¢/K.W.H.
 Next 160 K.W.H. @ 10¢/K.W.H.
 Next 100 K.W.H. @ 4¢/K.W.H.
 Excess K.W.H. @ 2¢/K.W.H.

GENERAL SERVICEDemand Charge

First 500 watts - \$1.00
 Next 4,500 watts - 10¢/100 W.
 Excess - 10¢/200 W.

Demand Charge

First KW - \$1.50
 Additional KW - .50/KW

Energy Charge

First 50 K.W.H. per K.W. @ 12¢/K.W.H.
 Next 50 K.W.H. per K.W. @ 10¢/K.W.H.
 Excess K.W.H. per K.W. @ 8¢/K.W.H.

Energy Charge

First 50 K.W.H. per K.W. @ 12¢/K.W.H.
 Next 200 K.W.H. per K.W. @ 10¢/K.W.H.
 Excess K.W.H. per K.W. @ 5¢/K.W.H.

WATSON LAKE RATESRESIDENTIAL1958

First 25 K.W.H. @ 25¢/K.W.H.
 Next 50 K.W.H. @ 20¢/K.W.H.
 Next 300 K.W.H. @ 15¢/K.W.H.
 Excess K.W.H. @ 10¢/K.W.H.

1969

First 40 K.W.H. @ 8.0¢/K.W.H.
 Next 160 K.W.H. @ 6.0¢/K.W.H.
 Next 400 K.W.H. @ 4.0¢/K.W.H.
 Excess K.W.H. @ 3.5¢/K.W.H.

GENERAL SERVICE

First 25 K.W.H. @ 25¢/K.W.H.
 Next 50 K.W.H. @ 20¢/K.W.H.
 Next 300 K.W.H. @ 15¢/K.W.H.

Demand Charge

First KW - \$1.50
 Additional KW - .50/KW

Energy Charge

First 50 K.W.H. per K.W. @ 12¢/K.W.H.
 Next 200 K.W.H. per K.W. @ 10¢/K.W.H.
 Excess K.W.H. per K.W. @ 5¢/K.W.H.

Table # 7

THE YUKON ELECTRICAL COMPANY LIMITEDPLANT INVESTMENT

<u>Plant</u>	<u>Investment</u>	<u>Cap.</u>	<u>Inv./KW</u>
aines Junction	\$168,355.00	550 KW	\$305.00
atson Lake	247,801.00	1,480	167.00
arnacks	88,706.00	450	197.00
eslin	71,332.00	500	142.00
estruction Bay	85,780.00	500	172.00
Beaver Creek	58,891.00	310	190.00
ld Crow	30,893.00	130	238.00
tewart Crossing	25,053.00	100	251.00
oss River	42,287.00	260	162.00
elly River Crossing	31,172.00	100	312.00
swift River	37,346.00	200	186.00

Table # 8

NORTHERN CANADA POWER COMMISSIONPLANT INVESTMENT

<u>Plant</u>	<u>Investment</u>	<u>Cap.</u>	<u>Inv./KW</u>
Fort Smith	\$402,629.00	2,250 KW	\$178.00
Fort Simpson	274,049.00	1,225	224.00
Fort McPherson	248,214.00	750	331.00
Field	119,080.00	400	300.00
Fort Resolution	113,230.00	325	348.00
Dawson	395,671.00	750	526.00
Coppermine	218,387.00	600	362.00
Cambridge Bay	196,033.00	850	231.00

YUKON ELECTRICAL EXPENSES(DIESEL PLANTS)

<u>Community</u>	<u>Expenses</u>	<u>K.W.H. Gen.</u>	<u>Cost/K.W.H.</u>
Watson Lake	\$160,807	3,890,000	4.13
Haines Junction	52,095	728,000	7.15
Carmacks	27,205	449,000	6.06
Teslin	37,653	814,000	4.63
Beaver Creek	33,935	601,300	5.64
Destruction Bay	37,978	761,000	4.99
Old Crow	23,515	127,000	18.51
Stewart Crossing	11,655	91,000	12.81
Ross River	22,249	418,000	5.32
Pelly River Crossing	11,303	133,000	8.50
Swift River	16,381	254,000	6.45

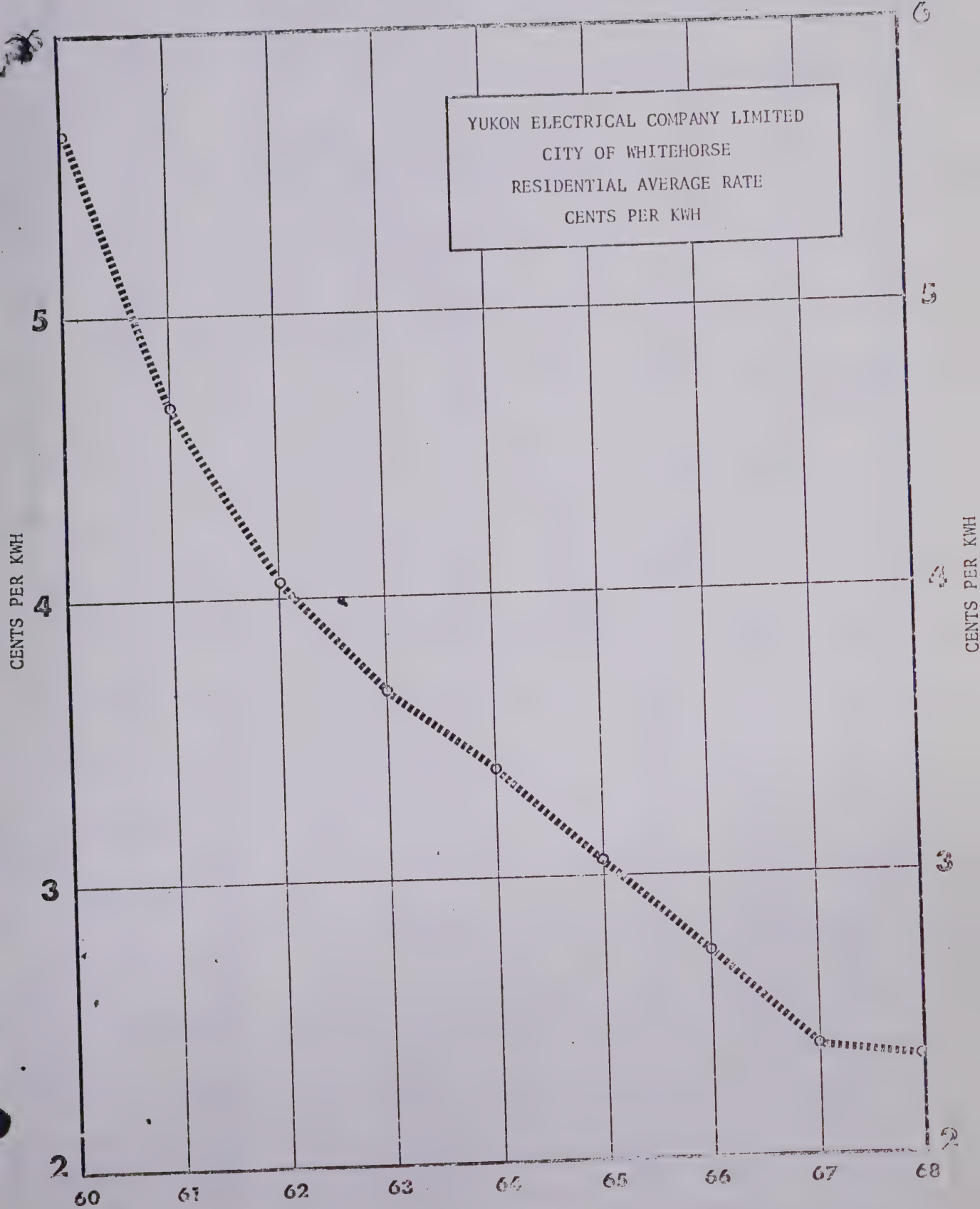
N.C.P.C. EXPENSES

<u>Community</u>	<u>Expenses</u>	<u>K.W.H. Gen.</u>	<u>Cost/K.W.H.</u>
Fort Simpson	\$175,665	2,535,000	6.91
Field	64,534	1,079,000	5.96
Ft. Resolution	75,797	722,000	10.5
Dawson	182,737	3,934,000	4.6
Coppermine	52,643	307,000	17.1
Cambridge Bay	197,421	1,491,000	13.2

Table # 11

COMPARISON OF REVENUE AND FUEL
COSTS FOR THE YEAR 1965 - 1966

<u>Location</u>	<u>Capacity</u>	<u>KWH Gen. x 1,000</u>	<u>KWH Sold x 1,000</u>	<u>Revenue \$</u>	<u>Fuel Cost ¢/KWH Gen.</u>	<u>Revenue ¢/KWH Sold</u>
Port Resolution	325	592	537	61,658	2.0	11.5
Port Chipewyan	375	782	630	50,159	2.1	8.0
aines Junction	400	650	643	56,934	2.1	8.9
eslin	450	715	585	44,816	2.1	7.7
estruction Bay	500	756	513	43,877	2.2	8.6
Beaver Creek	310	576	541	48,294	2.4	8.9
Wabasca	450	573	456	40,618	1.3	8.9



YUKON ELECTRICAL COMPANY LIMITED
CITY OF WHITEHORSE
RESIDENTIAL AVERAGE RATE
CENTS PER KWH

CHART #1

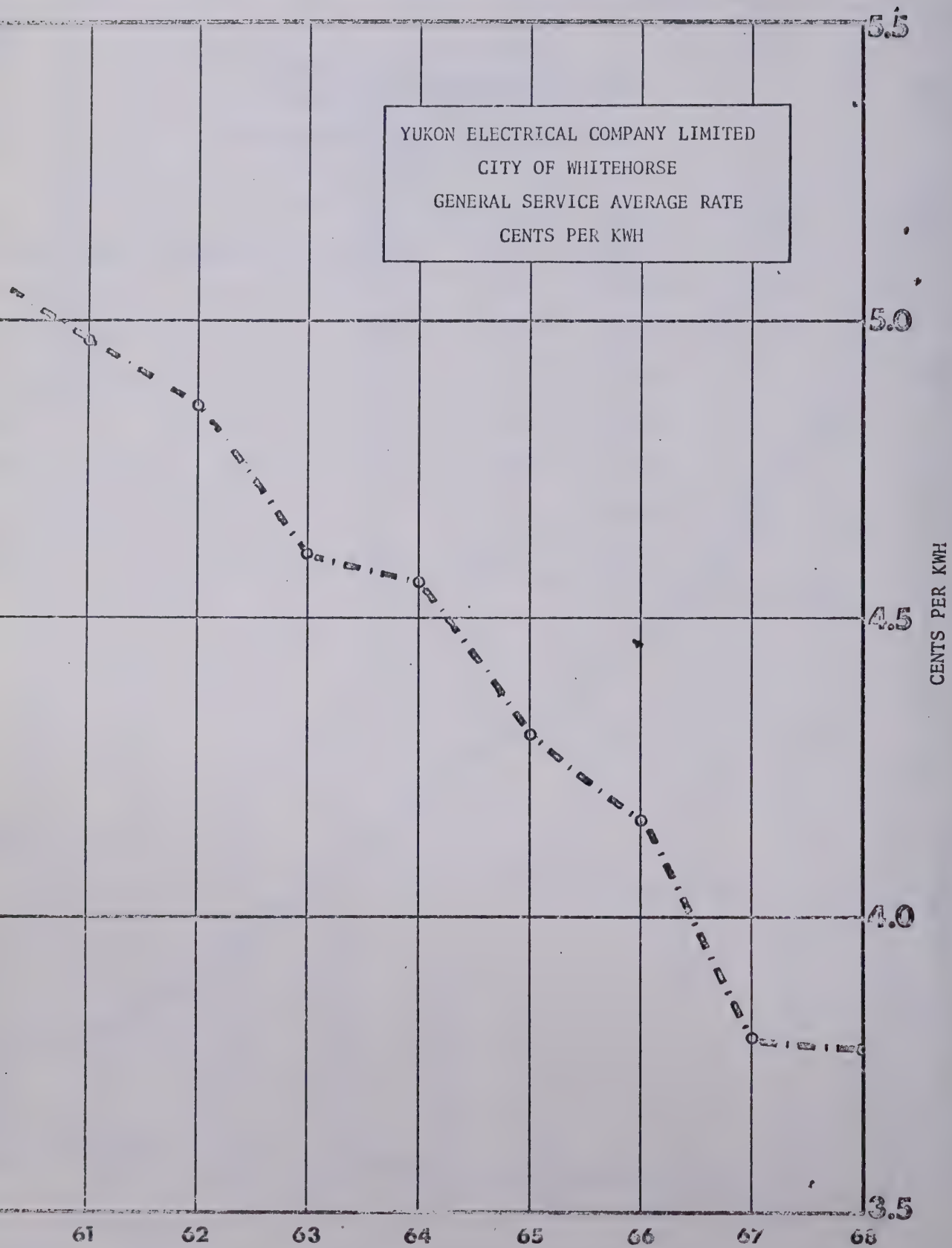
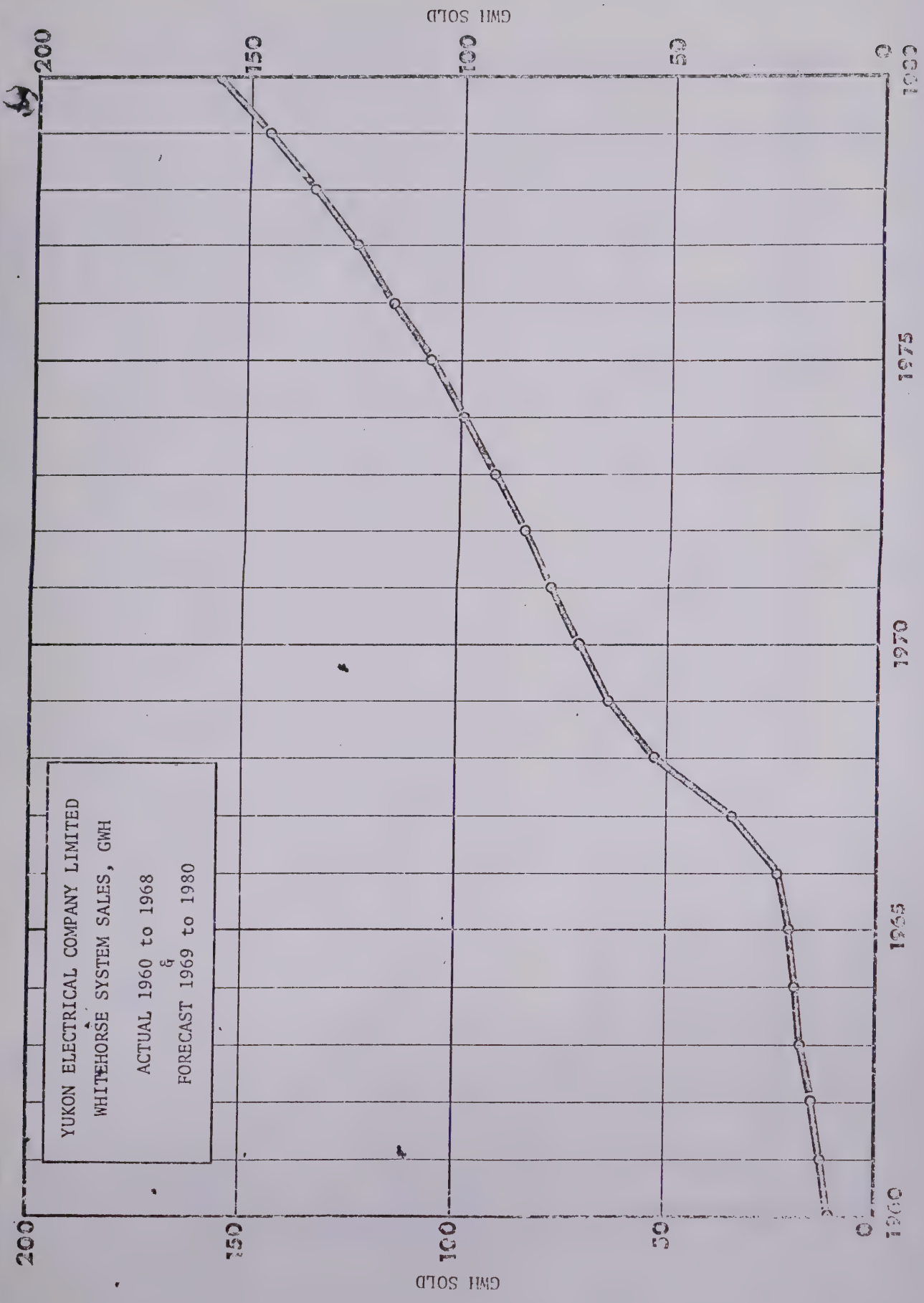


CHART #2



SUM OF ELECTRICAL LOADS IN YUKON
FORECAST to 1980

- (1) CARR REPORT.
- (2) MAXIMUM GROWTH - YUKON ELEC. EST.
- (3) PROBABLE GROWTH: 10% PER YEAR.

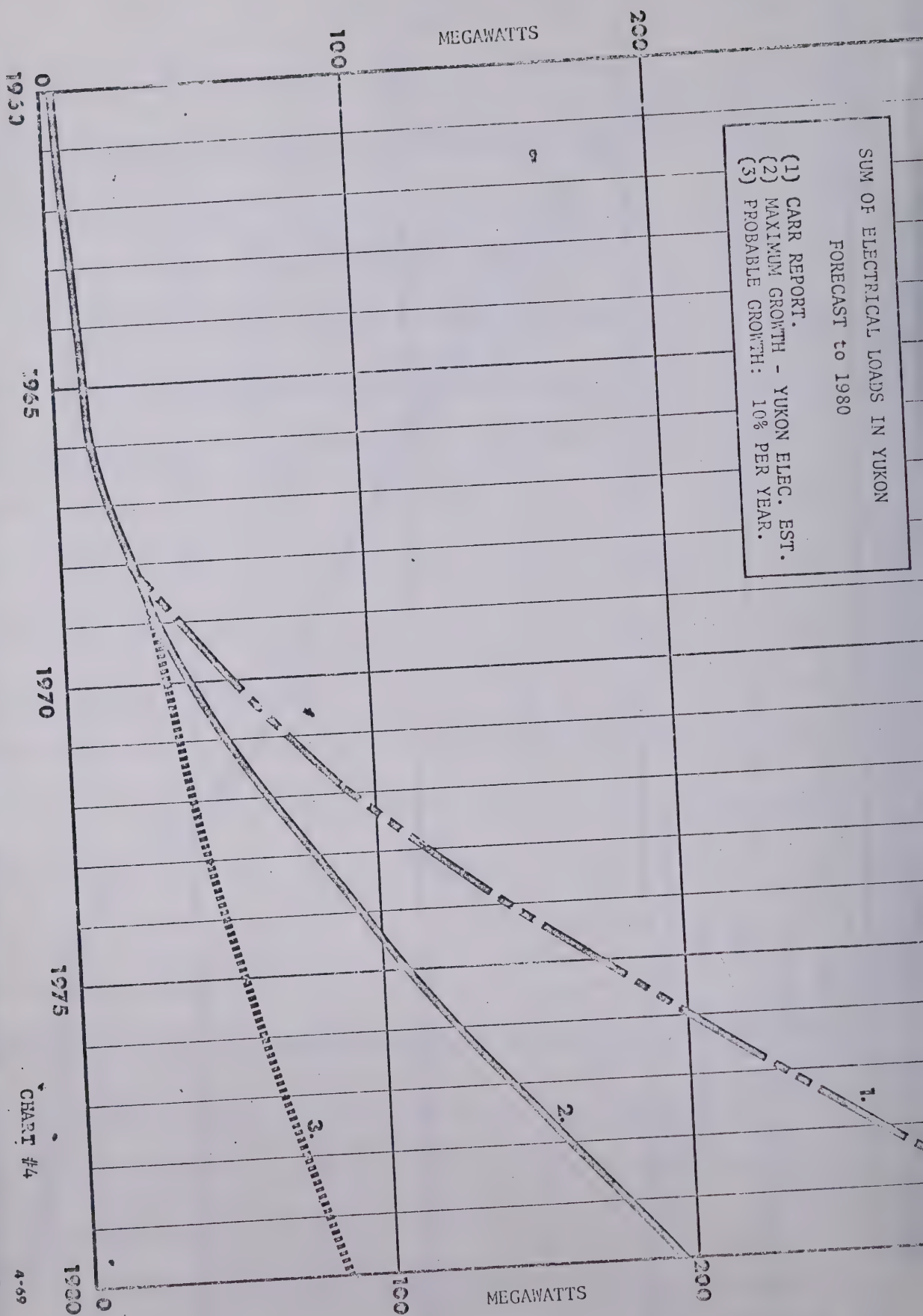


CHART #4

4-69

COSTS, MILLS PER KWH

40

1. Diesel

30

20

10

2. Steam

3. Hydro

TOTAL CAPITAL & OPERATING COSTS, MILLS/KWH
FOR VARIOUS SIZED GENERATING UNITS

- (1) DIESEL 0.5 MW UNIT (GRAY, 1969)
- (2) STEAM-YUKON SITE (STERLING, 1966)
- (3) HYDRO-YUKON SITES (INGLEDDOW, 1968)

40

30

20

10

COSTS, MILLS PER KWH

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